FINAL REPORT

DEPARTMENT OF THE AIR FORCE

in cooperation with

WYOMING OFFICE OF INDUSTRIAL SITING ADMINISTRATION

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LARAMIE COUNTY TRANSPORTATION PLAN

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City of Cheyenne, Laramie County
Wyoming Highway Department

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16 JUL 93

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Mr. Jack Bush
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1.0 Introduction

1.1 Project Background

This report documents the studies accomplished under the Cheyenne/Laramie County Transportation Planning Project dealing with 3 subtasks for Laramie County: (1) road inventory, (2) transportation plan, and (3) capital improvements program and maintenance plan.

The purpose of this report is to identify and deal with the impact on roadways maintained by Laramie County for deployment of the Peacekeeper system, an advanced land-based intercontinental ballistic missile system. Ultimately, 100 existing Minuteman III missiles will be replaced with 100 Peacekeeper missiles within missile squadrons located at F.E. Warren Air Force Base in Cheyenne, Wyoming. Installation of the Peacekeeper system is anticipated to occur between 1985 and 1991, subject to Congressional approval. Initially, 20 of the 100 missiles are scheduled for replacement between 1985 and 1986. Of these 20 missiles, 15 are situated in Laramie County.

1.2 Scope and Objectives

a. Road System Inventory
A road system review was conducted to assemble available information to determine the current status of roadways maintained by Laramie County. This review was supplemented by a physical field inventory of numbered county roads. Also, machine traffic counts were conducted at representative locations in the roadway system.

b. County Transportation Plan
Existing rural and urban roadway functional classification plans were reviewed for continuity. Roadway classifications were examined with regard to projected traffic demands to identify inconsistencies, if any.

An access map was developed to identify the optimum routing system for construction-related traffic between missile silo locations and major construction materials supply points (e.g., gravel pits, material supply depots, etc.). A traffic permitting procedure was also developed to monitor and control future Peacekeeper related construction traffic over county roads to missile silos.

c. Capital Improvements Program and Maintenance Plan
Past maintenance and construction programs were reviewed in terms of budgeting allocations and expenditures over the past 3 years. Current levels of maintenance equipment and staff were examined to determine capabilities to perform various types of work.

A maintenance priority schedule was developed for the county road network based upon existing conditions, projected traffic demand and desired condition.

A program for new roadway construction and major repair to support project related activity was developed for the county road network. Estimated annual costs for this program were prepared to identify any funding shortfalls.

1.3 Methodology

Road inventory format was developed and agreed upon through discussions with Mr. Bob Whitney who was acting on an interim basis as County Engineer. Road inventory was begun on September 18, 1984.

Data for the road system inventory was obtained from field observations while driving over numbered county roads. Mileage was measured to the nearest 0.01 mile using a "Trip Master" odometer installed in a passenger automobile. Physical dimensions of significant structures and culverts were directly measured while distances to signs and fences were recorded using an optical tape measure (Model M100, Ranging Inc., Rochester, N.Y.). Two individuals performed the inventory at all times, one driver/observer and one recorder. Potential problems with roads were observed and noted on the inventory. Right-of-way data and accident data were obtained from documents in the County Engineer's office and incorporated in the roadway inventory data.

Existing functional procedures for road systems were discussed with Mr. Bob Whitney (former County Engineer), Mr. Pete Hutchison (County Engineer), Mr. Darrel Hammer (Road and Bridge Office Administrator), and Mr. Ben Henan (County Road and Bridge Superintendent).

Road classification information was obtained from the City of Cheyenne Planning Office, Laramie County Engineer, and the Wyoming Highway Department.

Budget and expense information for the County Road and Bridge Department was obtained from Mr. Robert Cook in the County's Budget Office. Budget accrual and expenditure information for State-County, County Farm-to-Market projects were obtained from data furnished by the Wyoming Highway Department through the County Engineer's office.

2.0 Road System Inventory

2.1 Data Collection

a. Secondary Sources

Information pertaining to the following was obtained from documents available in the Laramie County Engineer's Office:

- Right-of-way data
- Accident data (last 3 years)
- Bridge inventory and sufficiency rating report

In addition, information was reviewed in the following documents:

- "Final Environmental Planning Technical Report - Transportation," January, 1984, Department of the Air Force

- "Inventory and Cost Estimate Report for Peacekeeper Routes," August, 1984, Department of the Air Force

b. Field Inventory

A physical inventory of roadways maintained by Laramie County was accomplished during the months of September and October of 1984.

Roadways were referenced to the County's existing mileline grid system. Items recorded in the physical inventory and identified as discrete entries in the data base include the following:

- Road No. and name (if any)
- Mileline location of each uninterrupted segment
- County maintenance classification
- Roadway characteristics
- Sideroad approaches or intersections
- Culverts
- Bridges
- Cattle guards
- Fences
- Overhead and underground utilities
- Railroad crossings
- Right-of-way
- Road signs and traffic signs
- Accident data

Data was referenced to the nearest 0.01 mile. Notations were made throughout the inventory to identify conditions which indicate a deterioration of either the roadway or an appurtenant part thereof (e.g., culverts, signs).

Bridges and culverts were examined to identify any obvious functional problems. Items in need of correction were noted and recorded on the inventory data.

c. Examples

Typical roadway features are shown on photograph exhibits which are contained in Appendix A. These illustrate representative examples of the range of conditions found in the County.

Photos No. 1 and No. 2 show some typical county paved roads. The road shown in Photo No. 1 is an example of pavement in excellent condition while that in Photo No. 2 shows a section of pavement which has begun to deteriorate. Photo No. 2 demonstrates the need for a systematic roadway monitoring and maintenance plan.

Photos No. 3 and No. 4 show typical graveled county roads. Photo No. 3 was taken of a section of roadway maintained by the Department of Defense (DOD) north of Missile Silo P7. Photo No. 4 shows a roadway section which is well maintained but does not have ample buildup for drainage or drifting snow. Although this latter section of road is not designated as DOD responsibility, its location as a connecting link between Missile Silos P-7 and P-9 suggests that it will be subject to additional traffic due to Peacekeeper activity.

Photos No. 5 and No. 6 show some typical large culverts. These photos illustrate the state of many such crossings in regard to side slope protection, roadway width delineators, and adequate cover (the culvert shown in Photo No. 5 is located on a project related T/E link).

Photo No. 7 shows a railroad crossing with flashing light warning. This is typical of roadways with significant traffic volumes. Remote railroad crossings do not generally have active warning controls and utilize only non-active traffic warning signs. Those locations are noted in the roadway inventory data. Such locations should be analyzed using accident frequency and traffic volume data to determine if upgrade of the warning system is warranted.

Photos No. 8 and No. 9 show typical cattle guards on the road systems. Photo No. 9 illustrates how rejected equipment tires are utilized on the narrower cattle guards to prevent damage to and by crossing traffic. So long as this method of protection affords the required protection, does not compromise safety, or does not impede traffic, its continued use is acceptable.

Photo No. 10 shows a typical approach to a missile silo. These approaches were well maintained.

Photos No. 11, 12, and 13 show typical primitive roads and undeveloped roads in the county. While not currently part of the county's maintenance responsibility, these roads experience limited local use. Some may eventually be improved and added to existing county road system.

Photos No. 14, 15, and 16 show some currently existing roadway signs on county roads. Photos No. 14 and No. 15 illustrate the problem of vandalism experienced throughout the county, especially in remote areas. Photo No. 16 illustrates the need for an upgrade of some signs to existing standards.

Photo No. 17 shows a stream crossing over a graded, low type road. Culverts are not used and cross-flow across the road is directly allowed. Ultimately, roadway buildup and addition of culverts may be required if traffic volumes warrant.

Photo No. 18 shows a warning sign for underground cable which crosses a county road. Such signing is non-existent at many other locations. It is recommended that the county impose a requirement for all utilities to install and maintain such warning signs at all county road crossings.

2.2 Database Development

The roadway inventory data was incorporated into a computer data base using an IBM PC compatible microcomputer with Lotus 1-2-3 software. This software package was specified for the project because of its availability at local agency offices. The Lotus software will enable future data storage, updating and retrieval of inventory information. Appendix B contains a description of the system and instruction for data access.

2.3 Road System Evaluation

a. Condition and Maintenance

A field inventory of county roadways was conducted during the months of September and October, 1984. The weather was favorable and roads were dry. As a rule, roads were in good condition and appeared to be well maintained. A few paved roadways showed signs of deterioration. A small number of gravel roadways were heavily weeded (e.g., Road 209 between Mileline 149 and 150), apparently due to low usage. These conditions, however, were the exception rather than the rule. Surface conditions observed were generally excellent.

b. Traffic Volumes

Machine traffic counts were conducted at 24 representative locations in the county road system. Each count was made for a duration of approximately 48 hours. In addition, traffic counts from the Wyoming Highway Department and the "Final Environmental Planning Technical Report - Transportation" (FEPTR-T) were used. Average daily traffic (ADT) counts were calculated and plotted on the Laramie County base map (Figure 2-1) which is located in the pocket of the back cover of this report. Based upon these values, estimated ADT projections at key locations of the roadway system have also been plotted.

Traffic volume data from the FEPTR-T report (shown as "URS 1983 ADT") were taken from traffic counts performed by the Wyoming Highway Department (WHD). Several supplemental counts were also taken by URS-Berger. URS counts were then rounded and included with the WHD traffic counts.

c. Drainage

Drainage structures and culverts were examined during the field inventory. Some bridges previously inventoried were in need of repair (e.g., guardrail missing, holes in pavement to bridge substructure). Deficiencies were noted in the field inventory and are described in more detail in the "Off System Bridge Inspection and and Inventory" report prepared by the Wyoming Highway Department.

Condition of culverts was generally good. Some culverts were plugged or had damaged ends as noted on the field inventory. Also, insufficient cover at some locations may present a problem for heavier traffic loads than those currently encountered.

Some roadway locations had no culverts even though a certain amount of cross-drainage occurs. At these locations, such cross-drainage is allowed to overflow the roadway during wet periods of the year. These particular roadway locations did not appear to suffer extreme damage, probably due to low traffic volume and infrequent flooding.

d. Traffic Volume Surveillance

Road maintenance requirements depend in large part upon the volume of traffic which uses particular sections of road, and the mix of traffic (passenger cars, pickup trucks, single unit trucks, combination trucks and special vehicles such as agricultural equipment or defense related transport vehicles). Representative traffic mix values should be obtained by periodic visual observations. These classification counts should be done at different times of the year and on different classes of road.

As noted in b. above, the traffic volume data available for the County road system is fairly sparse, and is based on observations collected at different points in time. Review of the data presented in Figure 2-1 should consider the following:

(1) The URS counts based on Wyoming Highway Department data are adjusted average daily traffic (ADT) values from 1983, while the ARIX counts are unadjusted 1984 raw counts rounded to the nearest 5 vehicles per day (no seasonal or axle mix adjustments).

(2) The Laramie County bridge counts were also obtained at different times, subject to different adjustment procedures, from the ARIX counts.

(3) The estimated ADT values are based upon the ARIX counts. The counting program was designed to obtain volumes radially away from Cheyenne (e.g. on Roads 215, 215A, 124), and parallel and perpendicular to major highways (e.g. the counts on Road 215 parallel to I-80, and the counts on Roads 142, 143 perpendicular to I-80 and U.S. 85). Other counts were used as benchmark values, from which estimates could be made (e.g. southwest on Road 210, east on Roads 154 and 223).

The variability and sparseness of count data underscores the need for implementing a regular counting program, as recommended in 4.2.b following. A regular counting program will permit upgrading and refining the traffic volume data base, and help make the estimating procedure more useful for forecasting volumes on the remainder of the county road system.

3.0 County Transportation Plan

3.1 Current Conditions

a. General

Rural collector road systems are designated by U.S. Department of Transportation under the following classifications:

Principal Arterial Roads
Minor Arterial Roads
Major and Minor Collector Roads
Local Roads

The following discussion of these classifications is taken from the U.S. Department of Transportation, Federal Highway Administration Publication "Highway Functional Classification - Concepts, Criteria and Procedures," dated July, 1974.

(1) Rural Principal Arterial Systems

The rural principal arterial system consists of a connected rural network of continuous routes having the following characteristics:

- Serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel.
- Serve urban areas of 50,000 and over population and a large majority of those with population of 25,000 and over.
- Provide an integrated network without stub connections except where unusual geographic or traffic flow conditions dictate otherwise (e.g., international boundary connections and connections to coastal cities).

The principal arterial system is stratified into the following two categories:

Interstate System - The Interstate subclassification consists of all presently designated routes of the Interstate System.

Other Principal Arterials - This subclassification consists of all non-Interstate principal arterials.

(2) Rural Minor Arterial Road Systems

The rural minor arterial road system should, in conjunction with the principal arterial system, form a rural network having the following characteristics:

- Link cities and larger towns (and other traffic generators, such as major resort areas, that are capable of attracting travel over similarly long distances) and form an integrated network providing interstate and intercounty service.

- Be spaced at such intervals, consistent with population density, so that all developed areas of the State are within a reasonable distance of an arterial highway.

- Provide (because of the two characteristics defined immediately above) service to corridors with trip lengths and travel density greater than those predominantly served by rural collector or local systems. Minor arterials therefore constitute routes whose design should be expected to provide for relatively high overall travel speeds, with minimum interference to through movement.

(3) Rural Collector Road Systems

The rural collector routes generally serve travel of primarily intracounty rather than statewide importance and constitute those routes on which (regardless of traffic volume) predominant travel distances are shorter than on arterial routes. Consequently, more moderate speeds may be typical, on the average.

In order to define more clearly the characteristics of rural collectors, this system should be subclassified according to the following criteria:

Major Collector Roads - These routes should: (1) Provide service to any county seat not on an arterial route, to the larger towns not directly served by the higher systems, and to other traffic generators of equivalent intracounty importance, such as consolidated schools, shipping points, county parks, important mining and agricultural areas, etc.; (2) link these places with nearby larger towns or cities, or with routes of higher classification; and (3) serve the more important intracounty travel corridors.

Minor Collector Roads - These routes should: (1) Be spaced at intervals, consistent with population density, to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road; (2) provide service to the remaining smaller communities; and (3) link the locally important traffic generators with their rural hinterland.

(4) Rural Local Road Systems

The rural local road system should have the following characteristics: (1) Serve primarily to provide access to adjacent land; and (2) provide service to travel over relatively short distances as compared to collectors or other higher systems. Local roads will constitute the rural mileage not classified as principal arterial, minor arterial road, or collector road.

b. Current Classification - County Roads in Laramie County

The Rural Highway Functional Classification of Roads in Laramie County was last adopted by the County Commissioners in October of 1975. With two exceptions, all county roads are designated minor collectors or local roads. Those exceptions are the roadway extending south from State Highway No. 214 near Carpenter (County Roads No.

203 and 151) and a portion of State Highway 225 (Otto Road). These are classified as a major collectors.

3.2 Development Needs

An Urban System and Roadway Functional Classification was approved by the City of Cheyenne along with County, State and FHWA officials in February, 1984. The recently adopted classification plan and urban boundary delineation illustrate that urban growth to the north and east have impacted City-County roadway systems significantly. The classifications of designated roads and streets crossing the urban boundary were examined for consistency with FHWA-DOT standards. Table 3-1 lists these roadways and their corresponding classification on each side of the urban boundary.

TABLE 3-1

EXISTING ROADWAY CLASSIFICATIONS AT URBAN BOUNDARY

Roadway	Urban Classification	Rural Classification
Interstate I-80	Principal Arterial	Principal Arterial
Interstate I-25	Principal Arterial	Principal Arterial
U.S. Highway 85 South (Greeley Highway)	Principal Arterial	Minor Arterial
State Highway 225 (Otto Road)	Principal Arterial	Major Collector
State Highway 210 (Happy Jack Road)	Minor Arterial	Major Collector
Yellowstone Road	Principal Arterial	Major Collector
Powder House Road	Minor Arterial	None*
Ridge Road	Collector Street	None*
Braehill Road	Collector Street	None*
Whitney Road	Collector Street	None*
Christensen Road	Collector Street	None*
Dell Range Blvd.	Principal Arterial	Major Collector
Pershing Blvd.	Collector Street	None*
Campstool Road	Collector Street	Minor Collector

The existing classifications are generally consistent with guidelines established by the Department of Transportation. Urban arteries form viable connecting links of rural arterials through the urban area. There are, however, five collector streets and one minor arterial street, shown by a "*" in Table 3-1, which do not have a corresponding rural classification. For consistency and continuity, these county roads should be designated minor collectors since they meet the classification criteria discussed previously.

3.3 Recommended Functional Classification Plan

A Rural Highway Functional Classification Plan has been prepared on a Laramie County base map (Figure 3-1). Recommended additions discussed above have been included. Also shown are current Transporter/Erector (T/E) routes. This map is located in the pocket of the back cover of this report.

4.0 Capital Improvements Program and Maintenance Plan

4.1 Current Conditions

a. County Engineer

The County Engineer's office is staffed by the County Engineer and an administrative assistant. Since major new construction is usually contracted and administered by the Wyoming Highway Department, additional personnel in the County Engineer's office are not staffed on a permanent basis.

b. Road and Bridge Department

The Road and Bridge Department is primarily responsible for maintenance of county roads and minor construction repair. During the summer months, maintenance activity generally consists of roadside mowing, grading of gravel roadways, and repair/patching of paved roads. Roadway sanding and plowing are done during the winter months. Drainage improvements (culverts) and sign replacement are on-going throughout the season as weather permits. The major equipment pool currently consists of the following items, shown in Table 4-1:

TABLE 4-1

LARAMIE COUNTY
ROAD AND BRIDGE DEPARTMENT EQUIPMENT POOL

6 - 8 C.Y. dump trucks
15 - Road graders
9 - Tractor mowers
18 - Pickups
2 - Flatbeds
3 - Tractor belly dumps
1 - Dozer
3 - 4 C.Y. front end loaders
1 - Snow blower
2 - 60 H.P. backhoes
1 - 300 ton/hr gravel crusher

The Road and Bridge Department is staffed approximately as shown in Table 4-2.

TABLE 4-2

LARAMIE COUNTY
ROAD AND BRIDGE DEPARTMENT STAFF POOL

1 - Superintendent
5 - Foremen
25 - Operators (including 3 mechanics)
7 - Laborers
1 - Office Administrator
1 - Office Staff Worker

The staff level increases during the summer months by approximately 6 equipment operators to meet roadside mowing requirements. Outside contractors are used throughout the year only when road maintenance of an urgent nature occurs which cannot be normally handled by the road and bridge staff and equipment.

c. Road Construction and Maintenance Programs

Projects for maintaining and improving the County Road System are initiated and administered under Laramie County's County Commissioner system. Commissioners receive direct input from either the general public or through other public agencies. Projects are assigned a priority and undertaken according to available funding and/or urgency. Presently, county road programs are administered as follows: (1) the Road and Bridge Department maintenance program, and (2) the State-County Roadway Capital Improvement Program through revenue sharing.

Minor roadway construction and maintenance are performed by the County Road and Bridge Department as funded under the County's budgetary process.

Major projects and capital improvements are primarily funded by State County - County Farm to Market (SC-CFM) funds, coal tax revenues, and mineral royalty revenues. This work usually consists of projects which qualify for revenue sharing and is administered through the Wyoming Highway Department (WHD). Potential projects are jointly reviewed by the County Engineer and the WHD and a priority is assigned. When funding is assured, projects are contracted and administered through the WHD. Upon completion of a project, the County is billed by the WHD for its share of cost for the work as determined by revenue sharing regulations.

The implementation of the Peacekeeper program will introduce a third category of maintenance and funding. This would involve a system based upon reimbursement of costs incurred due to impacts upon road systems by Peacekeeper activities. The impact of the Peacekeeper program upon the County's existing road maintenance will be discussed hereafter.

4.2 Projected Requirements for County Roadways

a. County Road and Bridge Maintenance Program

The maintenance needs for county road systems are reviewed on an annual basis by the Road and Bridge Superintendent and the County Engineer. The budget request is submitted to the County Budget Office for review and approval. Revisions are made when necessary to conform to revenue levels anticipated by the budget office.

The past annual budget and expenditures (last 3 years) for the Road and Bridge Department for maintenance of county roads are as follows:

TABLE 4-3

LARAMIE COUNTY
ROAD AND BRIDGE DEPARTMENT BUDGET AND EXPENDITURES

Fiscal Yr.*	Amount Budgeted	Amount Expended
1982	$1,305,524	$1,257,391 (96.3% of budget)
1983	$1,322,779	$1,287,164 (97.3% of budget)
1984	$1,475,893	$1,417,431 (96.0% of budget)

*July 1 through June 30

Funding for the County's Road and Bridge Department is accomplished primarily through sales and use taxes, property taxes, gasoline taxes, and a variety of other miscellaneous taxes imposed by the County. The amount budgeted for Fiscal 1985 is $1,498,620. The primary source of funds for road and bridge operation is the County's 1% optional sales tax, approximately 60% of which is dedicated to county road systems. This tax is voted upon every 2 years by Wyoming residents. Should this revenue source be lost in the future, it is estimated that services for County roadways would be reduced by 50%.

For the current fiscal year (1985), the 1% optional sales tax provides funding for the following (as budgeted):

Road Signing Material	$ 45,000
Road Materials	$ 87,000
Culverts	$ 50,000
Highway Matching Funds	$ 20,000
Heavy Equipment Repair	$ 85,000
Tires and Tire Repair	$ 20,000
Road Improvements	$ 1,000
Grader Cutting Edges	$ 40,000
Equipment	$315,000
TOTAL	$663,000

The figures in Table 4-3 show that amounts expended are adequately covered by the amounts budgeted. However, funds provided are primarily for basic maintenance of existing road systems with minimal provision for major new construction. Smaller improvements such as placement of new drainage culverts are usually accomplished under this budget.

Table 4-4 shows anticipated Road and Bridge Department budget and expenditures through 1990. Base amounts were formed using the actual budgeted amount for Fiscal 1985 and the actual expended amount for Fiscal 1984. Projections were calculated using a 5% inflation factor.

TABLE 4-4

LARAMIE COUNTY-ROAD AND BRIDGE DEPARTMENT
PROJECTED BUDGET AND EXPENDITURES

Fiscal Year	Amount Budgeted	Amount Expended
1985	$ 1,499,000	$ 1,488,000
1986	1,574,000	1,562,000
1987	1,652,000	1,641,000
1988	1,735,000	1,723,000
1989	1,822,000	1,809,000
1990	1,913,000	1,899,000
TOTAL	$10,195,000	$10,112,000

b. County Roadway Capital Improvement Programs

Funding of major capital improvements to county roadways is primarily administered under the County's State-County, County Farm-to-Market (SC-CFM) Program. Funding accrues on a monthly basis in accordance with a pre-set distribution formula. State-County income is derived from 10% of a 4 cent per gallon gasoline tax (State-County Fund) and 75% of a 1 cent per gallon gasoline tax (County Farm-to-Market Fund). In addition, the State Legislature recently enacted a provision for distribution of a 2.25% mineral royalty to be applied toward capital improvements.

The County is authorized to overdraw its SC-CFM account so long as such overdraft does not exceed one year's accrual plus the amount that will accrue during any awarded contract.

There also exists a coal tax revenue source which may be applied toward capital improvements. The future status of the coal tax revenue is uncertain at this time and may not be available in future years. This source would be a serious loss to the county and would severely strain its capital improvements program. Due to the uncertain status of this particular revenue source, it should not presently be counted upon as a certain revenue source until political events unfold and its status has been clarified.

The past annual accrual and expenditures (last 3 years) for SC-CFM Roadway Projects are shown in Table 4-5.

TABLE 4-5

LARAMIE COUNTY
ACCRUAL AND EXPENDITURES - SC-CFM FUNDS

Fiscal Yr.*	Amount Accrued	Amount Expended	Account Balance End of Fiscal Yr.
1982	$ 304,985	$ 13,629	$ 193,595
1983	$ 263,632	$ 407,206	$ 66,561
1984	$ 270,413	$ 66,449	$ 303,683

*July 1 through June 30

The following are new construction or major repair projects under the SC-CFM program on the county road system which are in the planning stage:

	Project	Fiscal Year	Estimated Cost
1.	Bridge Rehabilitation - Rd. 120 (Crow Creek)	1985	$ 250,000*
2.	Bridge Rehabilitation - Rd. 124	1986	325,000*
3.	Pave Portion Road 207B (Allison Rd.)	1986-87	50,000 (estimate)
4.	Redesign Portion Rd 125 (Walterscheid Blvd.)	1986-87	50,000 (estimate)
5.	Redesign Portion Rd 142 (Hillsdale Rd.)	1988-89	50,000 (estimate)
6.	Overlay Portions Rds. 164, 222, 203/151, 161, 164 (total approx. 34 miles)	1988-89	50,000 (estimate)

*Funding may be available through coal tax revenues

It is recommended that the County implement a long term roadway capital improvement program which will incorporate the projects above.

The action item listing below is suggested as a guideline for implementing such a program. The action items are listed in order of decreasing priority and may be revised to suit the special needs of the County. Data taken from the roadway inventory may be used to identify specific locations in the county road system.

- Upgrading roadway segments with a frequent history of accidents
- Repair or replacement bridges deteriorated by age or damage
- Resurfacing of deteriorating paved roadways
- Upgrading of selected existing gravel roadways to meet Wyoming Highway Department Standards "Design Guide for Local Roads and Streets" (July 1984) as justified by traffic volumes
- Upgrading and replacement of road and traffic signing at locations where such signing is sub-standard, damaged or non-existent
- Upgrading substandard cattle guards
- Upgrading drainage culverts with wing walls or riprap where erosion encroaches on road traveled way or shoulder

Since level of priority for a given roadway is primarily dependent upon average daily traffic volume, it is recommended that the County implement its own traffic counting system using automatic traffic counting machines (ATM's). Traffic volume data combined with design standards such as Wyoming Highway Department's (WHD) "Design Guide for Local Roads and Streets" (July 1984) may be used to form a basis for determining which specific roadways need upgrading and improvement. Standards published therein should be checked for conformance with AASHTO's recently published standard "A Policy on Geometric Design of Highways and Streets" - 1984 (Green Book). Tables 4-6 and 4-7 illustrate typical design guidelines contained in the WHD design guide.

A capital improvement program should incorporate all of the general priorities listed above. These may be further condensed into three general categories of improvements:

1. Bridge rehabilitation or replacement
2. Pavement construction or rehabilitation
3. Gravel road construction or upgrade

A long term capital improvement program will require a significant funding commitment. While such a commitment must be as flexible as possible, it is recommended that a long range plan be adopted to insure that sufficient time is allowed for design efforts and budgetary planning. Initially, it is recommended that the following minimum amounts (1984 dollars) be committed annually to the capital improvement program:

Bridge Rehabilitation/Replacement -	$300,000
Pavement Rehabilitation/Replacement -	150,000
Gravel Road Upgrade/Construction -	280,000
TOTAL	$730,000

These funds would enable accomplishment of work approximately as follows for each of the next several years:

1 each - Bridge Repair/Replacement
6 miles - Pavement Rehabilitation/Replacement
10 miles - Gravel Road Upgrade/Replacement

These figures will, of course, vary according to project complexity and location. However, the importance of implementing a long term, organized capital improvement program cannot be over emphasized.

The programs currently in the planning stage, bridge repair and pavement rehabilitation, partially meet these criteria. Additional consideration should be given to gravel road upgrade with priority given to areas with frequent history of accidents and segments which are substandard to those set forth in Wyoming Highway Department's "Design Guide for Local Roads and Streets."

Currently, the revenue sources for funding capital improvements in fiscal 1985 are as follows:

TABLE 4-6

DESIRABLE MINIMUM DESIGN SPEEDS

TYPE OF TERRAIN	DESIRABLE MINIMUM DESIGN SPEED (M.P.H.)						
	CURRENT AADT LESS THAN 50	CURRENT AADT 50-250	CURRENT AADT 250-400	CURRENT AADT OVER 400	PROJECTED DHV 100-200	PROJECTED DHV 200-400	PROJECTED DHV OVER 400
Level	50	50	60	60	60	60	60
Rolling	40	40	50	50	50	60	60
Mountainous	30	40	40	50	50	50	50

MINIMUM DESIGN SPEEDS

TYPE OF TERRAIN	MINIMUM DESIGN SPEED (M.P.H.)						
	CURRENT AADT LESS THAN 50	CURRENT AADT 50-250	CURRENT AADT 250-400	CURRENT AADT OVER 400	PROJECTED DHV 100-200	PROJECTED DHV 200-400	PROJECTED DHV OVER 400
Level	30	30	40	50	50	50	50
Rolling	20	30	30	40	40	40	40
Mountainous	20	20	20	30	30	30	30

NOTE: The Minimum Design Speeds shall be used only where site conditions dictate. The desirable values shall be used wherever reasonably feasible. Where necessary, the Minimum Values may be used for a particular section of road or location when the proper advance warning signing is provided.

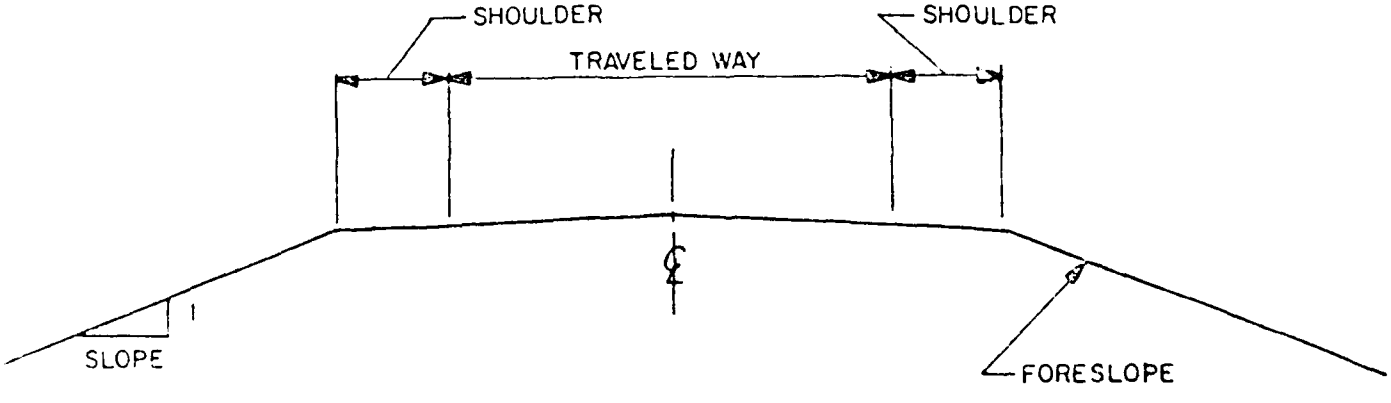
TABLE 4-7

MINIMUM WIDTH OF TRAVELED WAY AND SHOULDER

DESIGN SPEED (MPH)	WIDTH OF TRAVELED WAY (FEET) FOR DESIGN VOLUMES					
	CURRENT AADT UNDER 250	CURRENT AADT 250-400	CURRENT AADT OVER 400	PROJECTED DHV 100-200	PROJECTED DHV 200-400	PROJECTED DHV OVER 400
20	18	20	20	20	22	24
30	18	20	20	20	22	24
40	20	20	22	22	22	24
50	20	20	22	22	24	24
60	20	22	22	22	24	24
ALL DESIGN SPEEDS	WIDTH OF PAVED OR GRADED SHOULDER (FEET)					
	2	2	4	6	8	8

NOTE: (1) The shoulder width is measured from the edge of the traveled way to the point of intersection of the shoulder slope and foreslope (fillslope).

(2) It is recommended that the shoulders be paved to allow usage during inclement weather; to minimize damage from vehicles and to lessen the moisture that infiltrates into the base courses.



SC-CFM	2.25% Mineral Royalty	Total
$264,839	$357,506	$622,345

Assuming that existing budgets and revenues increase at the rate of 5% annually, projected budget and expenditures for capital improvements are shown in Table 4-8 (exclusive of DOD participation for Peacekeeper related projects):

TABLE 4-8

LARAMIE COUNTY - CAPITAL IMPROVEMENTS
PROJECTED BUDGET AND EXPENDITURES

Fiscal Year	Amount Budgeted	Projected Requirement
1985	$ 622,000	$ 730,000
1986	653,000	767,000
1987	686,000	805,000
1988	720,000	845,000
1989	756,000	887,000
1990	794,000	932,000
TOTAL	$ 4,231,000	$ 4,966,000

It will be noted that projected revenue falls short of the need which means that additional revenue sources would be required. If the shortfall cannot be made up because of political considerations, the result would inevitably be a reduced program for capital improvements.

c. Peacekeeper Roadway Maintenance Program

The implementation of the Peacekeeper program will require additional maintenance effort for county road systems. In particular, road networks leading to converted missile silos will experience increased use during and after construction activity. Upgrading of roadways from gravel to pavement will require the County to increase its capability for maintenance of paved roads.

Approximately 200 miles of county roadways may ultimately be directly affected in Laramie County. Additional road maintenance equipment and operating personnel will be required.

Implementation of a monitoring/surveillance program for Transporter/Erector (T/E) road systems would insure that responsibility for roadway damage due to oversize or overweight loads is properly assessed by the County and reimbursed by responsible parties. It is estimated that the approximate equivalent of at least one person-year would be required annually for 1) administration, 2) patrolling, and 3) reporting of traffic activity on T/E roads. Administration activities would include coordination of the overall traffic monitoring procedure, issuing traffic permits, distribution of reports, and coordinating operations with other agencies. Patrolling activities

would include monitoring permit regulated traffic movements by the County's designated representative (e.g., County Sheriff, Road and Bridge Foreman, etc.). Reporting of traffic activity would include periodic inspection of T/E roadways (including joint inspections with military representatives), maintaining current road information in a microcomputer data base using selected road maintenance software.

Total projected staff and equipment required for maintaining the Peacekeeper system is estimated to be as shown in Tables 4-9 and 4-10 (1984 dollars):

TABLE 4-9

T/E ROADWAY SYSTEM MAINTENANCE - PROJECTED REQUIREMENTS

Equipment	Initial Purchase	Annual Maintenance
1 - Caterpillar 140 road grader	$125,000	$ 2,500
4 - 8 C.Y. dump trucks (tandem axle) @ $51,000	204,000	4,000
2 - Diesel tractors @ $100,000	200,000	4,000
2 - Belly dump trailers @ $50,000	100,000	2,000
1 - Snow blower	45,000	900
1 - Asphalt distributor	50,000	1,000
3 - Pickups @ $9,000	27,000	900
1 - 4 C.Y. front end loader	128,000	2,600
1 - 60 H.P. backhoe	40,000	1,000
1 - 14 ton steel wheel roller	23,000	500
2 - Sander/snow plows @ $11,000 ea.	22,000	500
2 - Quick couplers (loader & grader) @ $6,000 ea.	12,000	500
6 - FM radios @ $1,000 ea.	6,000	600
Total	$982,000	$21,000

Personnel	Annual Cost
1 - Superintendent @ 1/4 time ($26,000)	$ 6,500
1 - Foreman @ 1/2 time ($21,000)	10,500
4 - Equipment operators @ 1/2 time ($19,000)	38,000
1 - Maintenance Mechanic @ 1/4 time ($20,000)	5,000
Total	$60,000

TABLE 4-10

T/E ROADWAY SYSTEM MANAGEMENT - PROJECTED REQUIREMENTS

Equipment	Initial Purchase	Annual Maintenance
Microcomputer Equipment/Software	$10,000	$ 3,000
1 - Pickup	9,000	200
2 - Automatic Traffic Counter Monitors (ATMs) @ $1,000 ea.	2,000	100
Total	$21,000	$ 3,300

Personnel	Annual Cost
One person-year for administration, patrolling, reporting	$35,000

The above costs are summarized as shown in 1984 dollars in Table 4-11 for the period from 1985 to 1990. Annual increases of 5% have been used to account for inflation.

TABLE 4-11

SUMMARY OF PROJECTED EQUIPMENT AND STAFFING COSTS FOR LARAMIE COUNTY T/E ROAD SYSTEM MAINTENANCE

	Initial Equipment Purchase	Equipment Maintenance	Personnel
1985	$1,003,000	$24,300	$ 95,000
1986	-	25,500	99,800
1987	-	26,800	104,700
1988	-	28,100	110,000
1989	-	29,500	115,500
1990	-	31,000	121,200
TOTAL	$1,003,000	$165,200	$646,200

The funding above will enable the county to effectively monitor Peacekeeper impacted roadways for damage and deterioration and assure a means for documenting claims for roadway damage due to Peacekeeper activity. In order to form a basis for a sound maintenance plan, surveillance of county roads may be conducted approximately every 30 to 60 days depending upon location and frequency of traffic activity. Surveys may be conducted in the following priority sequence:

1. Paved Transporter/Erector Links
2. Paved Project Related Links
3. Gravel Transporter/Erector Links
4. Gravel Project Related Links
5. Gravel Roadway Access Routes Between Active Gravel Pit Sources and Missile Silos
6. Program impacted County Roads with Estimated ADT Over 400
7. Program impacted County Roads with Estimated ADT Between 250 and 400

8. Program impacted County Roads with Estimated ADT Between 50 and 250
9. Program impacted County Roads with Estimated ADT Less Than 50

Upon completion of each survey, information may be entered into the computer data base programmed to identify and prioritize roadway repairs. The data may be structured to sort, for any given priority, work to be accomplished, project manpower scheduling, or project equipment requirements necessary to accomplish required tasks. Pavement management software such as California Pavement Management System may be used to manage County pavement resurfacing and rehabilitation. Some modification of the "pavement management" approach could be employed for gravel roads.

d. Financial Summary of Projected Construction and Maintenance Requirements for Laramie County Roads

A summary of all the previously discussed projected funding and expenditures for county roads is shown in Tables 4-12 and 4-13.

TABLE 4-12
PROJECTED COUNTY ROADWAY EXPENDITURES

F.Y.	Road & Bridge	Capital Improvements	Peacekeeper Maintenance	Total
1985	$ 1,488,000	$ 730,000	$1,122,000	$ 3,340,000
1986	1,562,000	767,000	125,000	2,454,000
1987	1,641,000	805,000	132,000	2,578,000
1988	1,723,000	845,000	138,000	2,706,000
1989	1,809,000	887,000	145,000	2,841,000
1990	1,899,000	932,000	152,000	2,983,000
TOTAL	$10,122,000	$ 4,966,000	$1,814,000	$16,902,000

TABLE 4-13
PROJECTED COUNTY ROADWAY REVENUES

F.Y.	Road & Bridge	Capital Improvements	Peacekeeper Maintenance	Total
1985	$ 1,499,000	$ 622,000	$1,122,000	$ 3,243,000
1986	1,574,000	653,000	125,000	2,352,000
1987	1,652,000	686,000	132,000	2,470,000
1988	1,735,000	720,000	138,000	2,593,000
1989	1,822,000	756,000	145,000	2,723,000
1990	1,913,000	794,000	152,000	2,859,000
TOTAL	$10,195,000	$ 4,231,000	$1,814,000	$16,240,000

It has been assumed that the expense of roadway maintenance for the Peacekeeper program will be reimbursed to the county on a dollar-for-dollar basis. If this is not the case, the County will suffer financially and it is certain to adversely impact any planned maintenance and capital improvement programs. As shown, the non-

Peacekeeper programs project a $662,000 deficit through 1990 and other means of funding must be explored to prevent any reduction in roadway maintenance and improvement services. Retention of the coal tax revenue would help restore funding shortfalls. An increase in the county sales tax would be another possible source. However, political considerations must be dealt with and such additional sources are not assured.

4.3 Construction Traffic Control Plan

a. Access Routes

Construction related traffic for the Peacekeeper system should be confined as much as possible to designated T/E routes. Figure 4-1 has been developed to show a routing network over county roads. This map is located in the pocket in back cover of this report. The network includes State/Federal highways, designated T/E routes over county roads, and Non-T/E county roads used for access to gravel pit sources. Also included are Non-T/E county roads which provide direct access from gravel pit supply points designated in the FEPTR-T report to the missile silos scheduled for initial deployment of the Peacekeeper system. The designated gravel pits and missile silos scheduled for modification (Laramie County) are listed in Table 4-10.

TABLE 4-14
LARAMIE COUNTY GRAVEL PITS AND MISSILE SILO CONVERSIONS

Gravel Pits				Missile Silos		
L1	L7	L12	L17	P4	P9	Q5
L2	L8	L13	L18	P5	P10	Q6
L3	L9	L14	L19	P6	P11	Q7
L4	L10	L15	L20	P7	Q3	Q8
L5	L11	L16	L21	P8	Q4	Q11
L6						

The roadway network shown on Figure 4-1 was developed to provide roadway access between any gravel pit source and any given missile silo listed above.

b. Permitting and Surveillance Plan

In order to maintain the condition of Transporter/Erector (T/E) roadways at a level required to support defense site needs, a program for monitoring Peacekeeper related traffic over county roads should be implemented. Such a program would assure continual surveillance of roadway and structures condition for deterioration, damage, and extraordinary maintenance needs.

The State of Wyoming has enacted Statute 31-5-1002(a)(x) which requires that cargos hauled over county roads that exceed weight and size limitation for state highways are required to have a permit issued by the County. A permitting system administered by the County would enable maintenance personnel to more closely monitor roadways and, thus, claim reimbursement for damage to roadways caused by Peacekeeper related traffic. A suggested format for a county road permit is shown in Figure 4-2.

FIGURE 4- 2

Laramie County
Cheyenne, Wyoming

No._____

SPECIAL TRANSPORT PERMIT FOR COUNTY ROADS
for
OVERSIZE/OVERWEIGHT
Peacekeeper-Related Traffic on Transporter/Erector Routes

Place of Issue _____ TIME AM / PM _____ Date _____ 19 _____

This Permit is issued in accordance with the following statute of the State of Wyoming:

Any load hauled on county roads that exceeds the legal weight and size limitations as prescribed by State statutes for State Highways is required to have a permit issued by the County to move on County roads [Wyoming Statute 31-5-1002(a)(x)]

Shipment Consists of: _____

From: _____ **To:** _____

Over State Highways _____

Over County Roads _____

On Following Dates: _____

No. of Trips _____ **Vehicle License** _____ **Make-Type of Vehicle** _____

Trailer License: _____ **Special License:** _____ **Trl. House Serial** _____

Gross Weight: _____ **No. of Axles:** _____ **Dist. 1st to Last Axle:** _____ **Overall Length** _____ **FT**

Overhang Front _____ **FT. Rear** _____ **FT. Height** _____ **FT. Width:** _____ **FT.**

THE FOLLOWING RESTRICTIONS MUST BE OBSERVED AS CHECKED

- ☐ Flagmen required Number_____
- ☐ Pilot Front & Rear
- ☐ County Inspector Req.
- ☐ One Pilot Car Required
- ☐ Oversized Load Sign Front and Rear (Wide-Long)
- ☐ Two Pilot Cars Required
- ☐ Loads in excess of 140,000 lbs (Gross) must travel at less than 10 M P H in the center of the driving lane when crossing bridges.
- ☐ Other restrictions as follows

If the requested permit is granted, the undersigned agrees

1. To take every precaution to protect the roadway and the traffic from damage or injury using pilot cars or flagmen to warn the traveling public on all blind curves both vertical and horizontal
2. In case of overwidth of load, the cargo is to be placed on the vehicles with the overhang as far to the right as possible, and shall be loaded to present the minimum hazard to traffic
3. To be financially responsible and to make prompt payment for any damage caused to the traffic, overhead signs, wires, cables and other installations or to the roadway or bridges by the transportation of this load
4. That the operator of the vehicle or vehicles is duly licensed according to statute
5. To operate the vehicle or vehicles at all times in accordance with any and all provisions of law, except as exempted herein, with regard to motor vehicles and the operation thereof
6. That he understands and accepts all provisions and requirements of this permit
7. To indemnify and hold harmless Laramie County, its officers and employees from all suits, actions or claims of any character whatsoever brought because of any injuries or damage received by any person, persons or property arising from the issuance of use of this permit
8. The Road & Bridge Office (Phone No. 638-4302) shall be notified within 24 hours of the time when the oversize and/or overweight trip is to begin. This office may postpone the movement of any load if the condition of the road (wet, snow, etc.) is such that the load could cause excessive damage to the road
9. Any overweight or oversize load found in violation of permit requirements will be stopped immediately by the County patrol officer. The load shall be parked and violation corrected before the load can be moved again

Applicant's Name _____ Signature _____

Applicant's Address _____

This application when signed by the Laramie County Engineer or authorized representatives, in the space below provided becomes the requested permit subject to the above conditions, and with the understanding that no liability is assumed by the County by reason of its issuance in regard to condition of roads or capacity of culverts and bridges, and the applicant is charged to make necessary examination and inspection as to the adequacy of road or bridge to care for the traffic movement. In the event of emergency the Laramie County officials of the County have authority to suspend this permit until emergency conditions have passed.

Approval by County Engineer

Approval by County Road & Bridge Superintendent

cc: County Engineer
County Road & Bridge Superintendent
County Sheriff
Wyoming Highway Department

Many methods and procedures are possible for monitoring roadway conditions in a given locality. A final plan for doing so must be coordinated with the needs and capabilities of the agency assigned that responsibility. The following procedures may be used as a guideline for determining a final policy format:

- Implement an active and operational permit procedure for all T/E routes.

- Perform a general inspection (by County Road and Bridge Official) of T/E roadways on a monthly basis. Complete a written inspection report.

- Perform a roadway inspection (by County Road and Bridge Official) of T/E roadways recently used to transport overweight/oversize traffic shipments. Perform inspection within 48 hours after shipment is completed. Prepare a written report on findings.

- Perform a joint roadway inspection (by Air Force Base Official and County Official) of T/E routes in the spring and fall of the year (April and November). Prepare a written inspection report with acknowledgement by both inspecting parties on the inspection report form. Additional joint inspections may also be conducted on an "as-required" basis.

- Submit copies of any written inspection report noting damage or deterioration (if any). Process reports as required by State/ Department of Defense agreements or procedures.

- Issue quarterly follow-up status reports of remedial or repair work undertaken. Include data showing future work scheduled, work in progress, and work completed during the current fiscal year.

APPENDIX A - PHOTO EXHIBITS

Photo #1 - Paved road, good condition, Road 120
Photo #2 - Paved road, deteriorating, Road 124
Photo #3 - Graded and drained road, high type, Road 132
Photo #4 - Graded and drained road, low type, Road 235
Photo #5 - Double 48" CMP culvert, Road 128
Photo #6 - 96" CMP culvert, Road 132
Photo #7 - Railroad crossing, flashing light warning, Road 120
Photo #8 - Cattle guard - high type
Photo #9 - Cattle guard - intermediate type
Photo #10 - Approach to Missile Silo P-8
Photo #11 - Primitive road
Photo #12 - Undeveloped road - low type
Photo #13 - Undeveloped road - high type
Photo #14 - Damaged traffic sign, Road 203
Photo #15 - Damaged road sign
Photo #16 - Non-standard road sign, Road 146
Photo #17 - Bear Creek crossing @ Road 237 (graded, low type)
Photo #18 - U/G Missile Silo cable crossing sign - Road 237

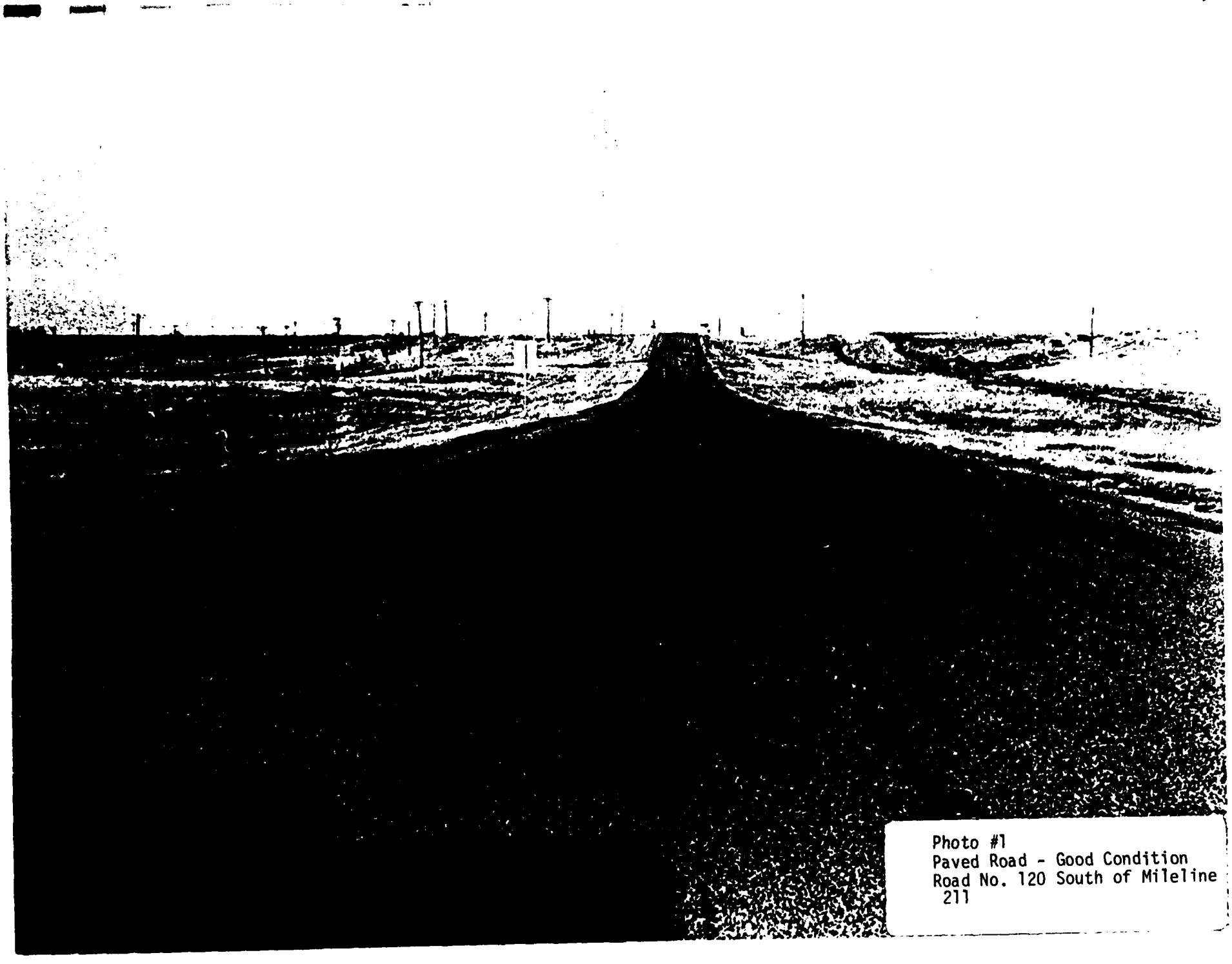


Photo #1
Paved Road - Good Condition
Road No. 120 South of Mileline
211

Photo #2
Paved Road - Deteriorating
Road No. 124 North of
Mileline 224

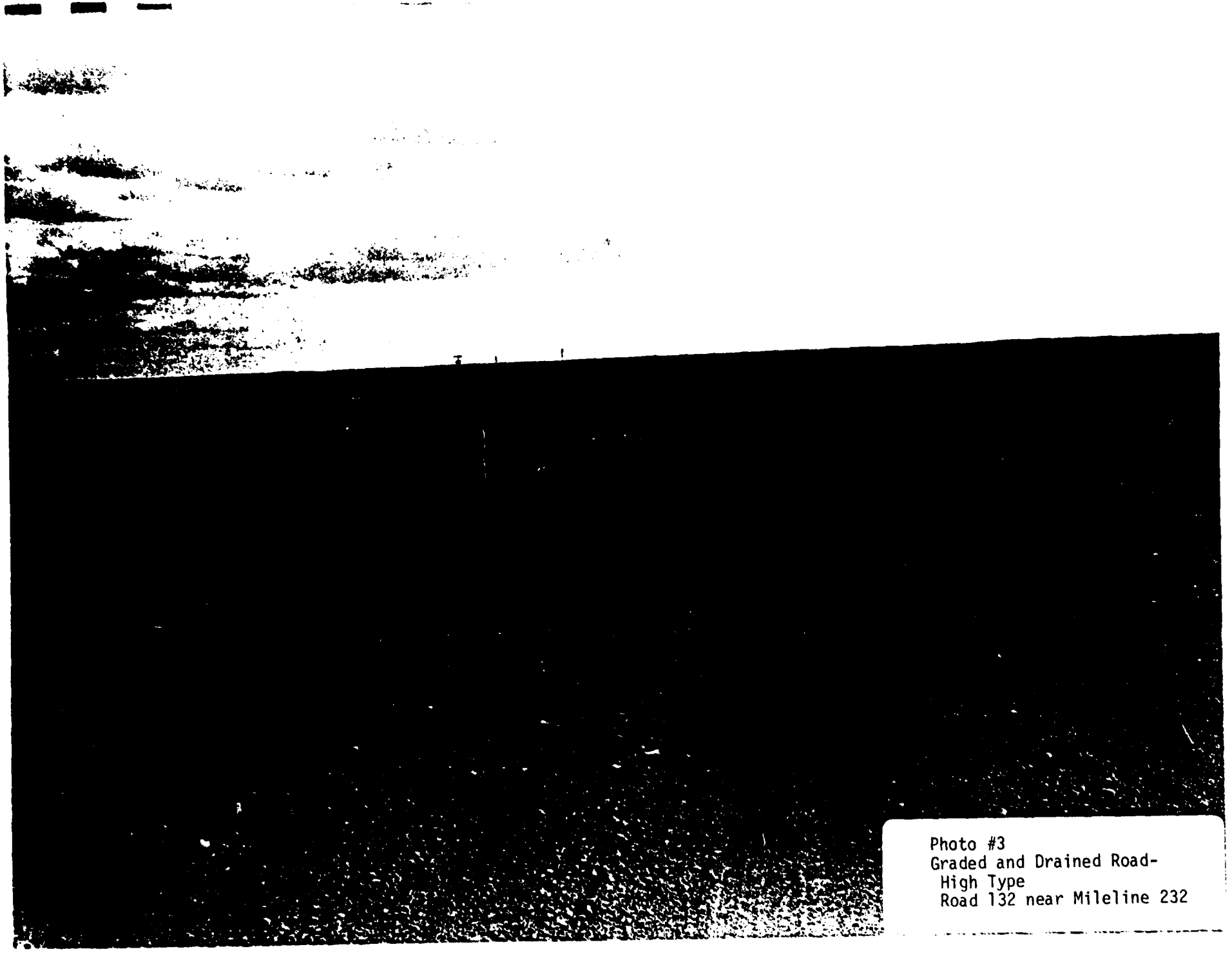


Photo #3
Graded and Drained Road-
High Type
Road 132 near Mileline 232

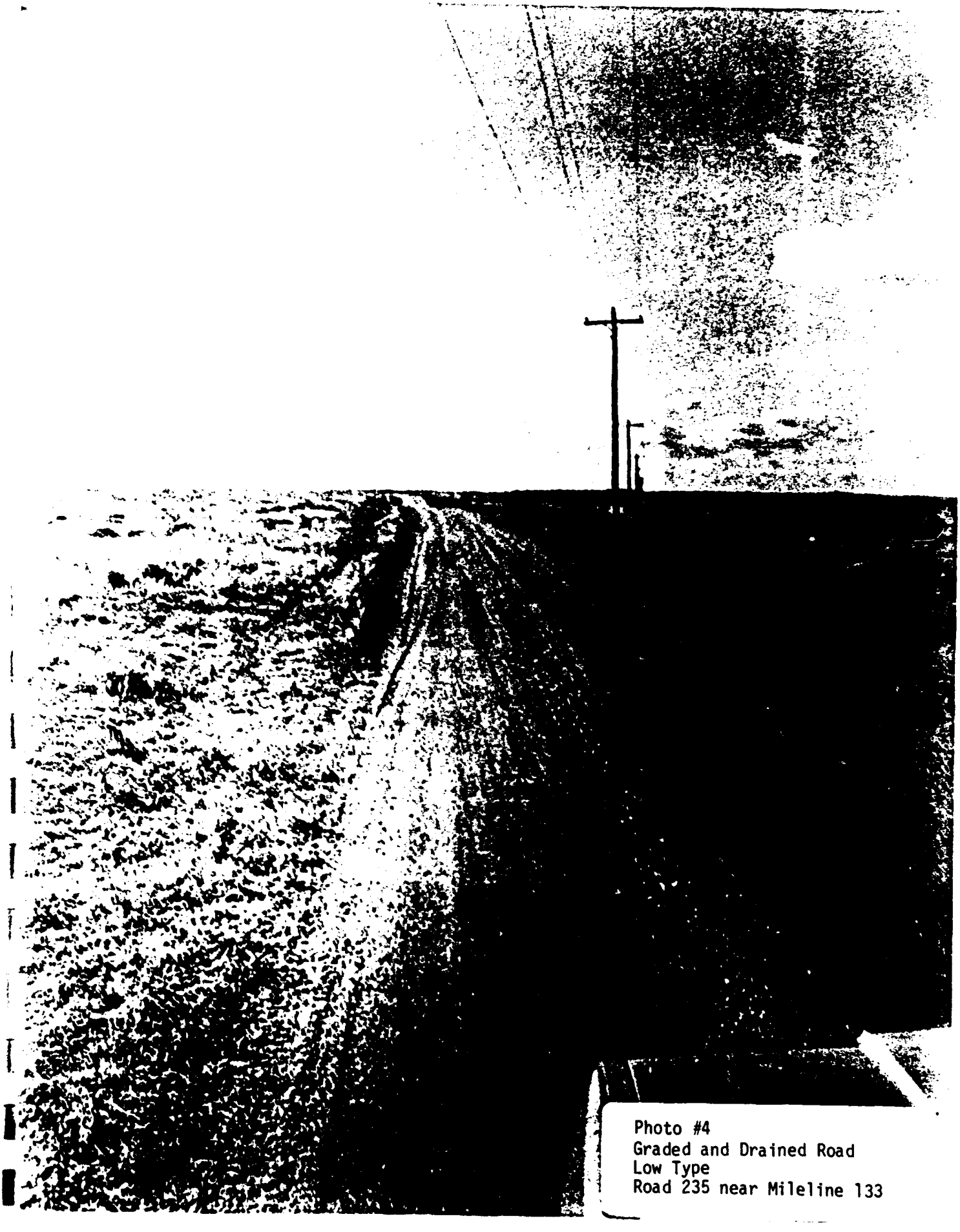


Photo #4
Graded and Drained Road
Low Type
Road 235 near Mileline 133

Photo #5
Double 48" CMP Culvert
Road 128 - Horse Creek

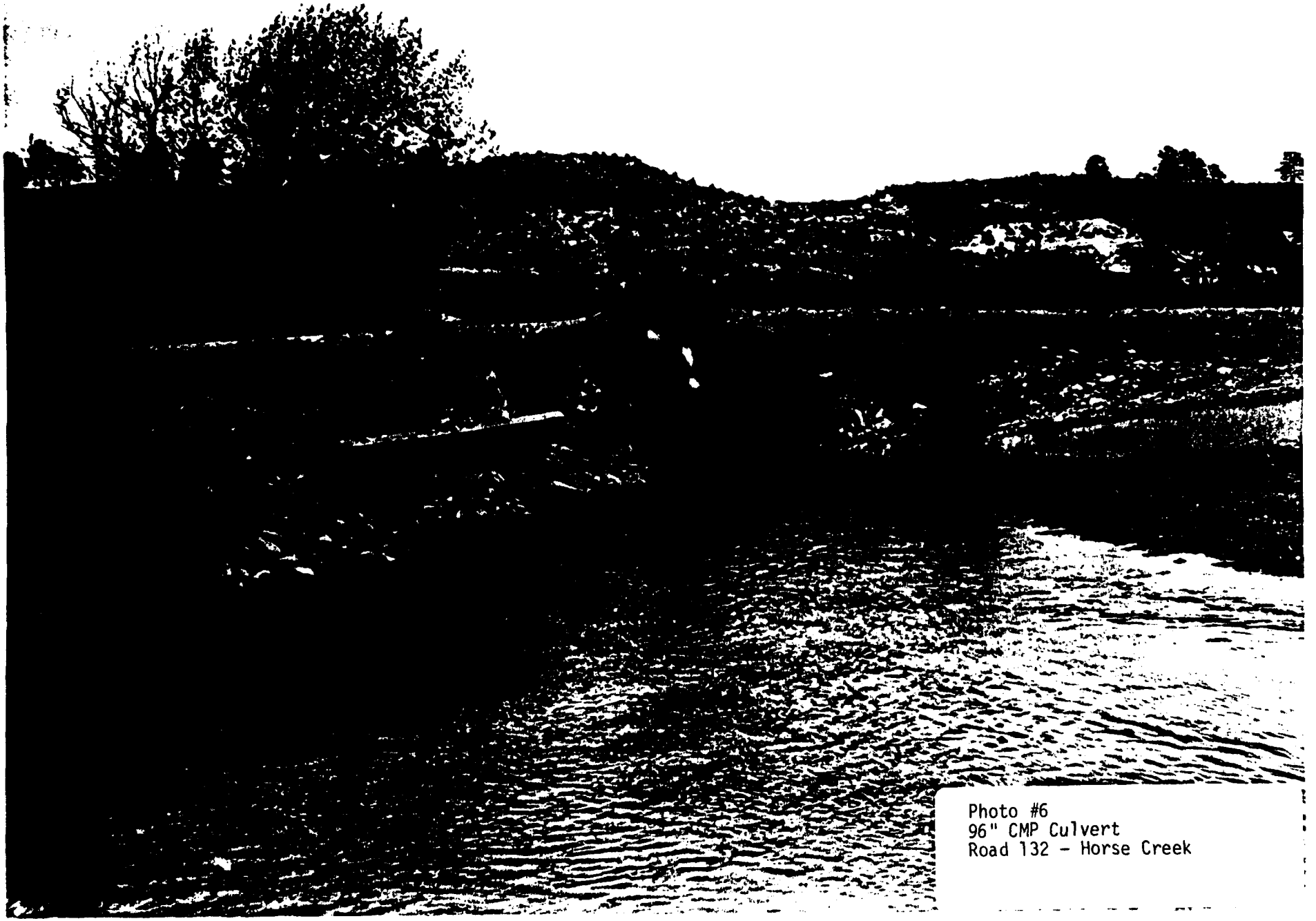


Photo #6
96" CMP Culvert
Road 132 - Horse Creek

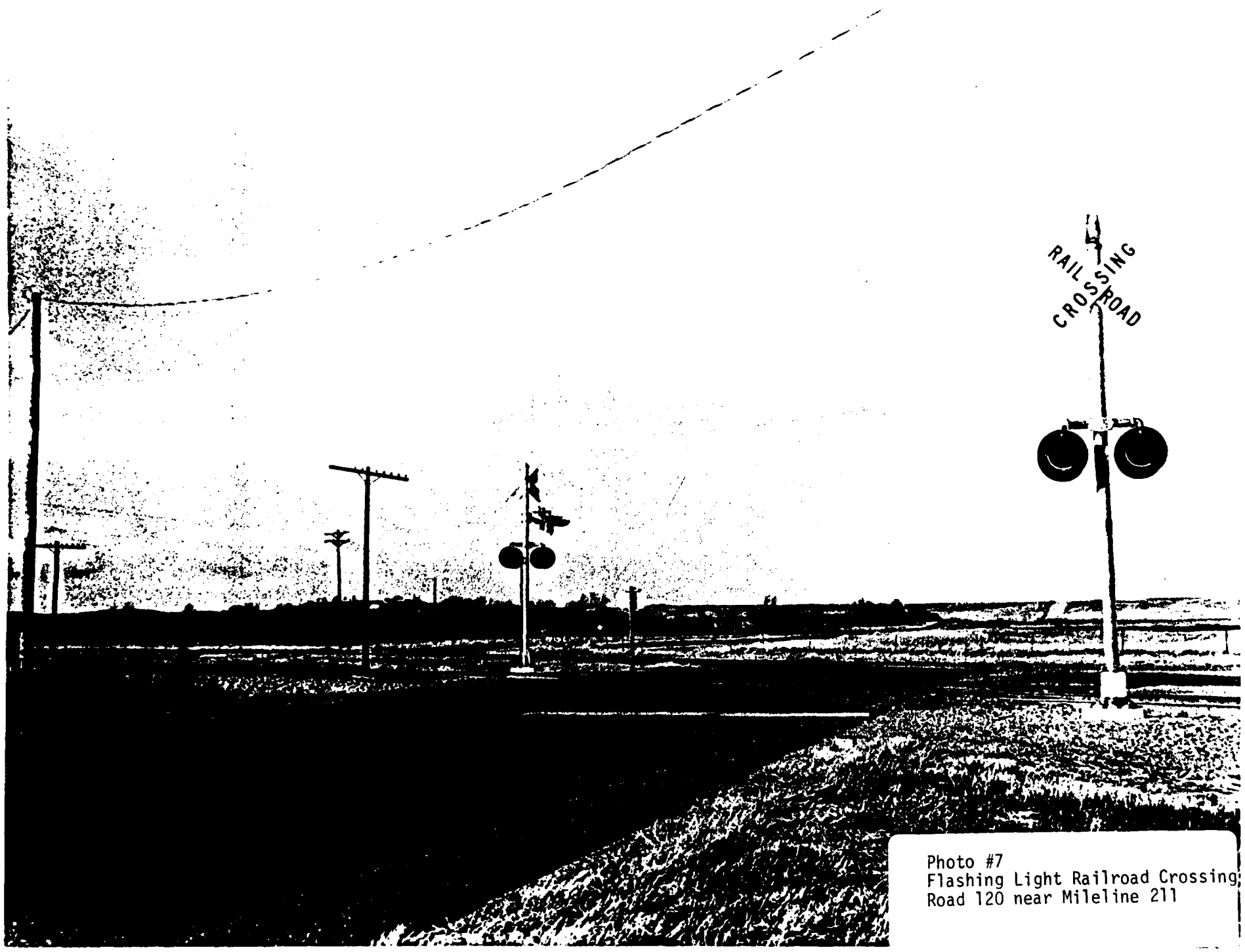


Photo #7
Flashing Light Railroad Crossing;
Road 120 near Mileline 211

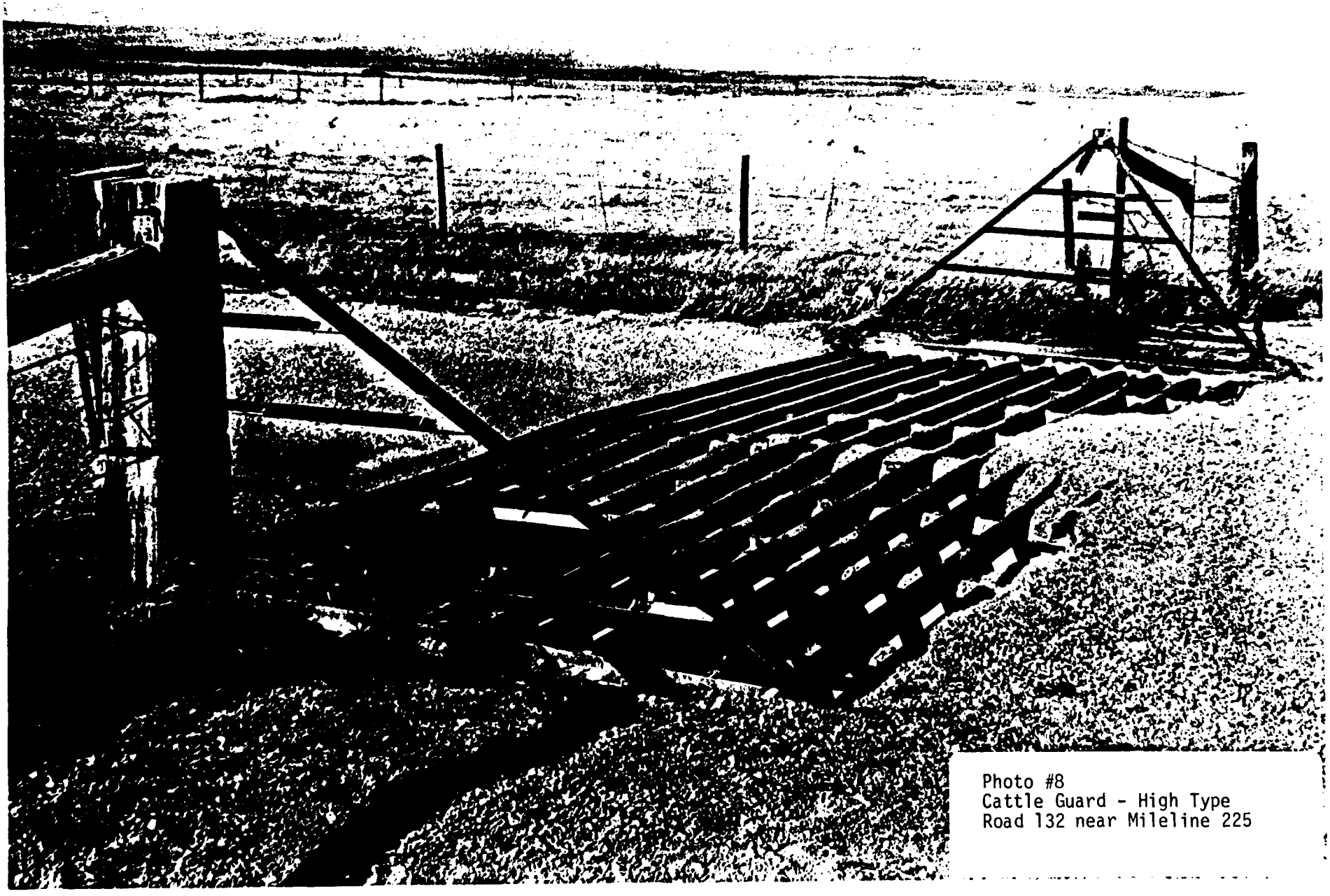


Photo #8
Cattle Guard - High Type
Road 132 near Mileline 225

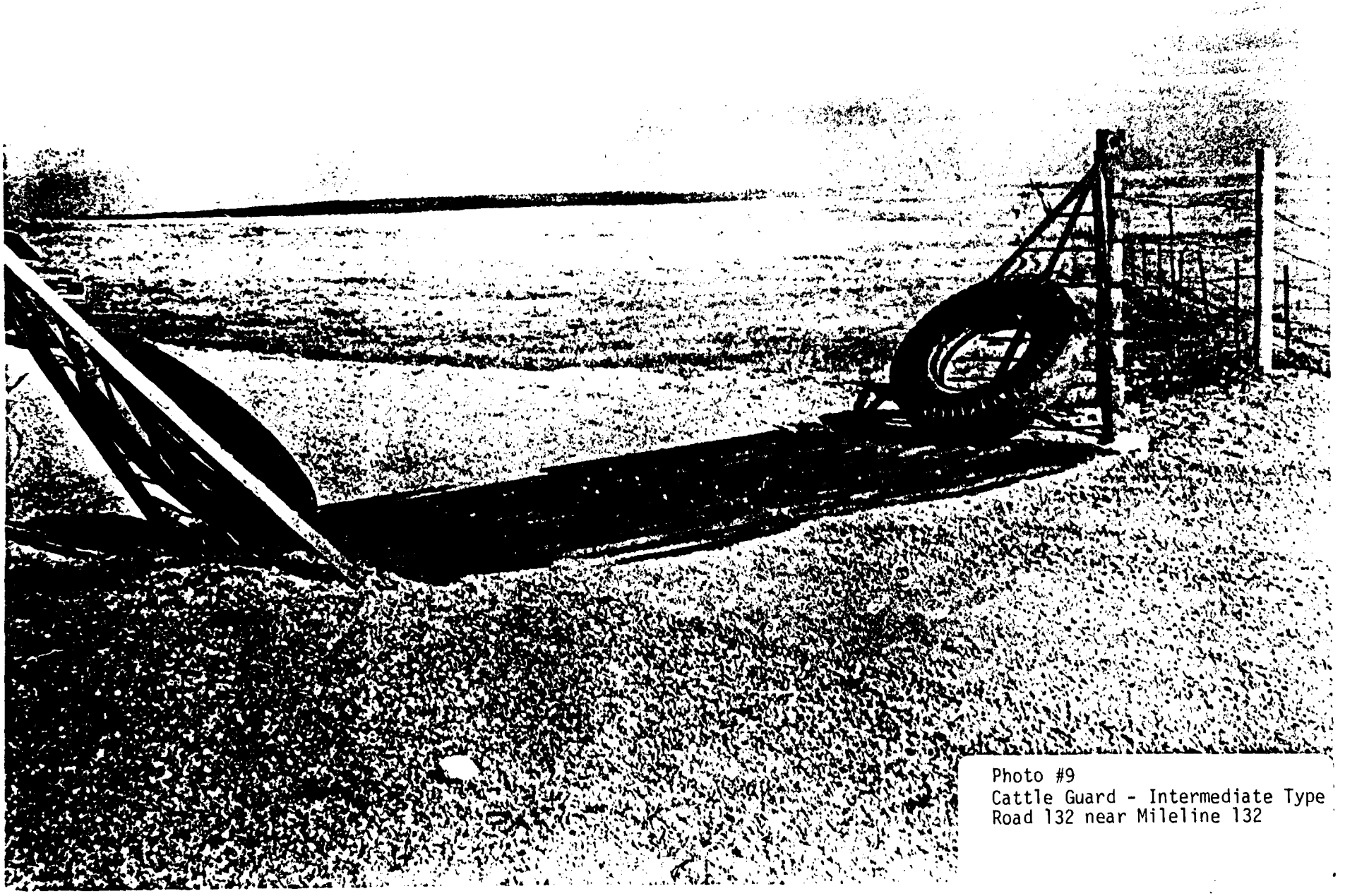


Photo #9
Cattle Guard - Intermediate Type
Road 132 near Mileline 132

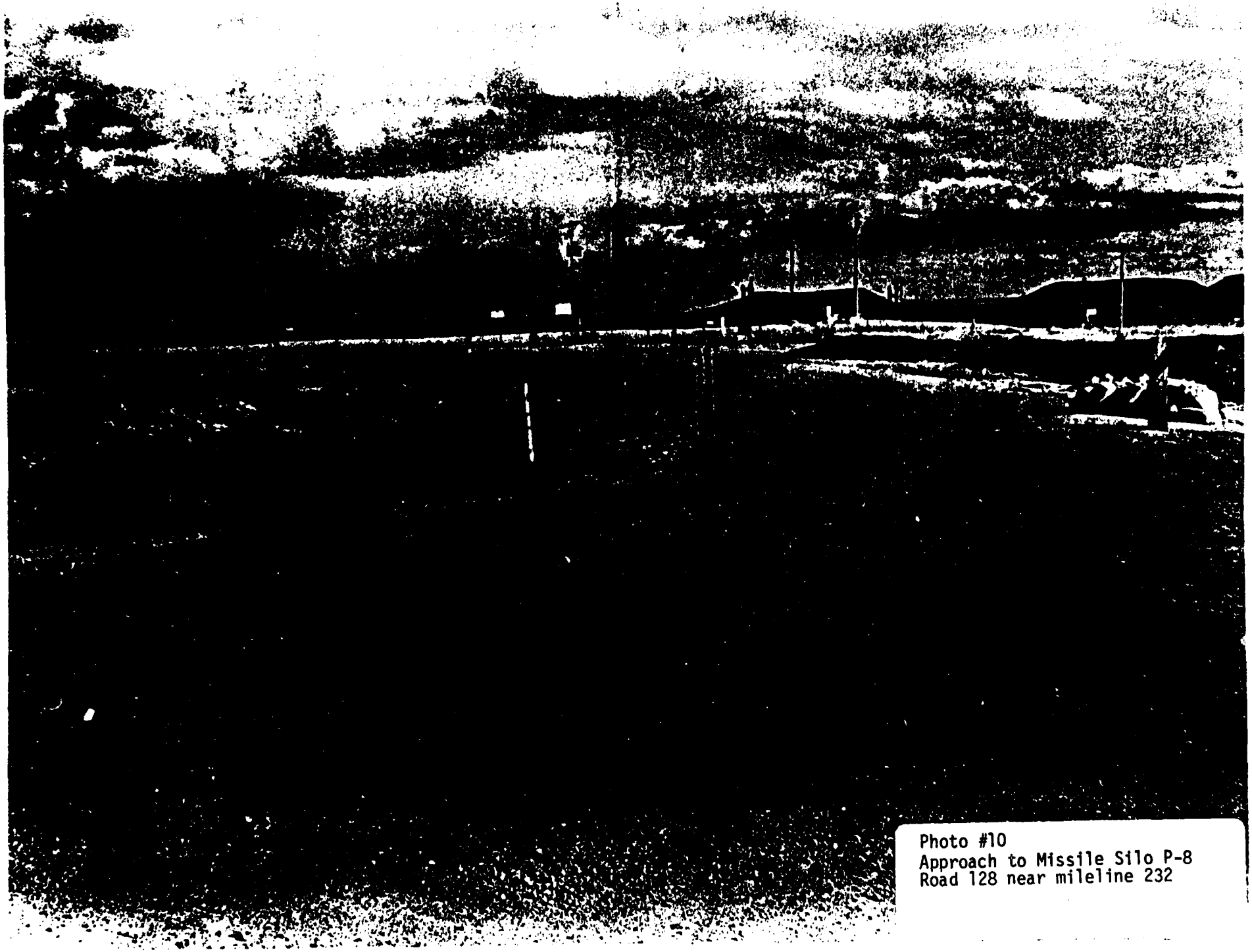


Photo #10
Approach to Missile Silo P-8
Road 128 near mileline 232

Photo #11
Primitive Road
North of Carpenter, WY

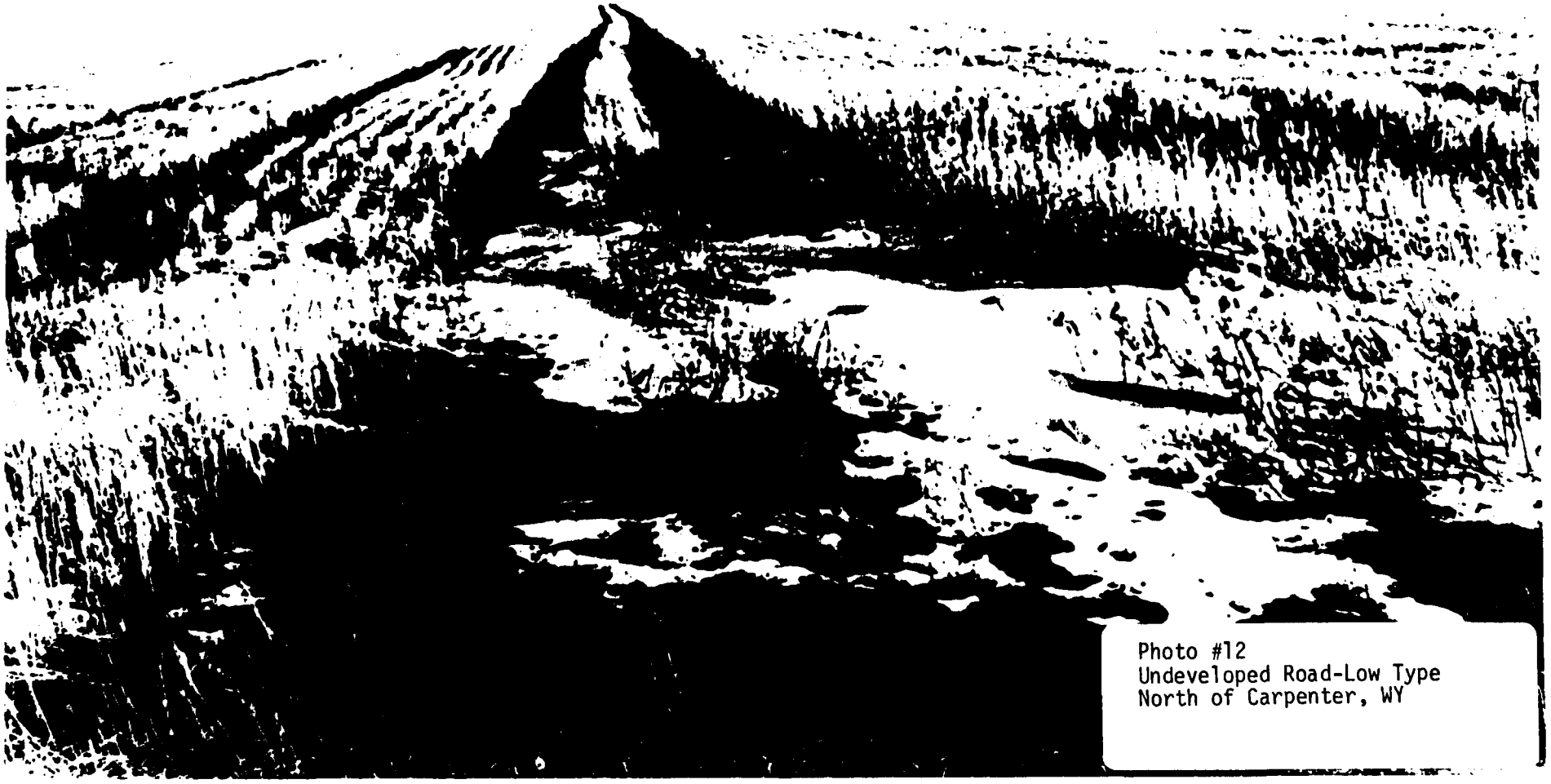


Photo #12
Undeveloped Road-Low Type
North of Carpenter, WY

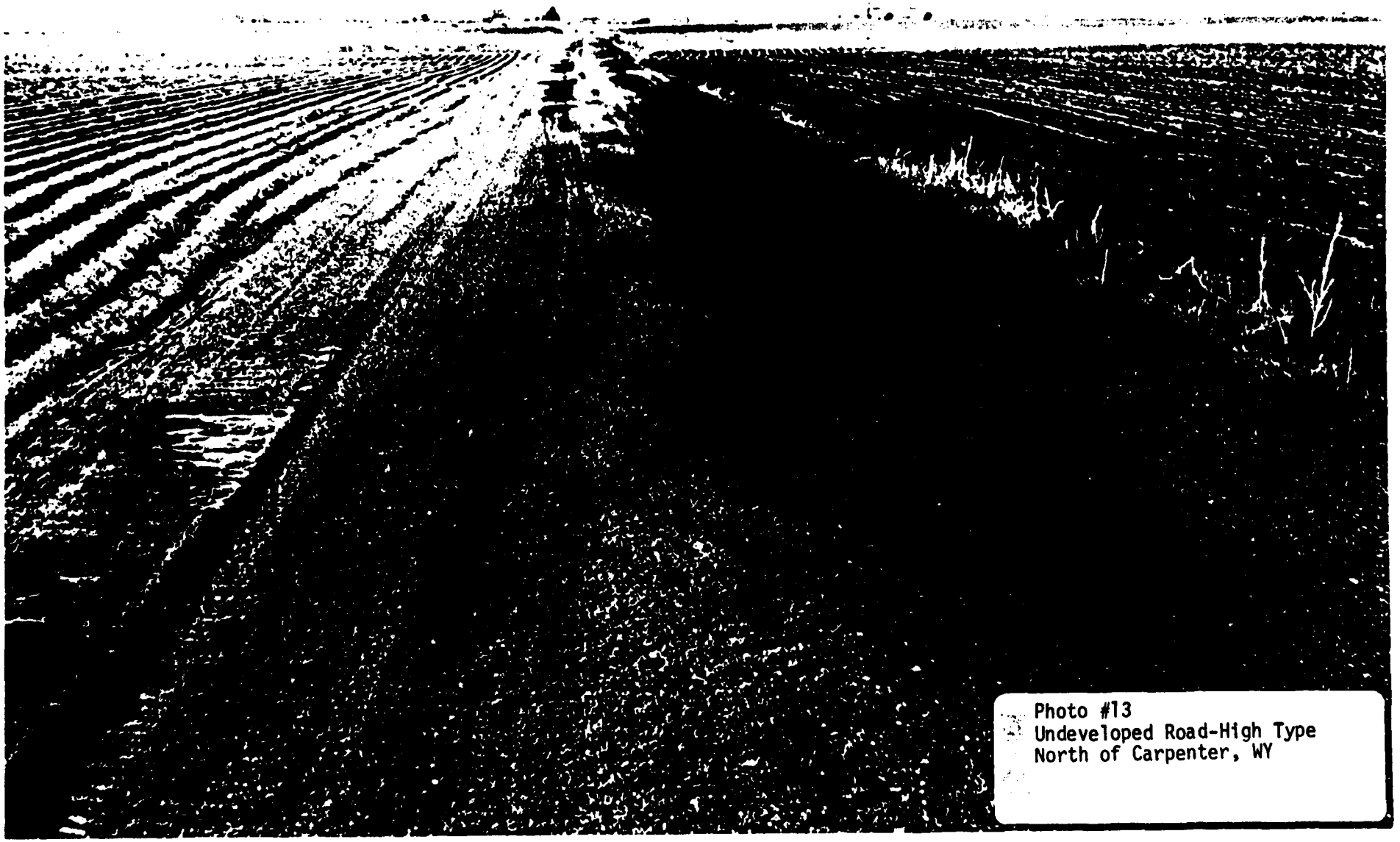


Photo #13
Undeveloped Road-High Type
North of Carpenter, WY

Photo #14
Damaged Traffic Sign
Road 203, Mileline 134

Photo #15
Damaged Road Sign

Photo #16
Non-Standard Road Sign
Road 146

Photo #17
Road 237
Bear Creek Crossing
Graded, Low Type Road

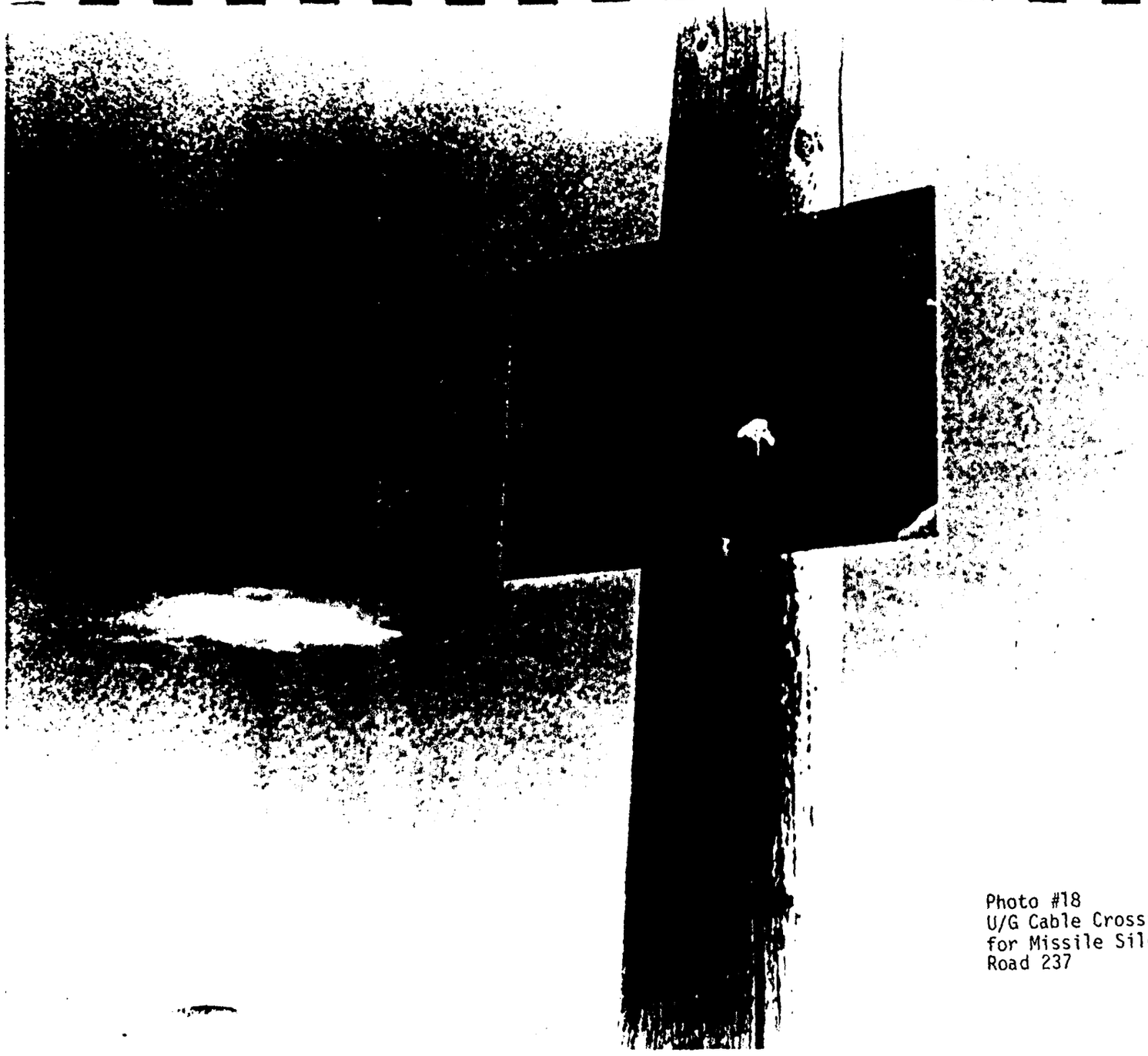


Photo #18
U/G Cable Crossing Sign
for Missile Silos
Road 237

APPENDIX B - DATABASE USER'S GUIDE FOR COUNTY ROADWAY INVENTORY

B-1 General

Lotus 1-2-3 is a desk-top computer program consisting of three kinds of software; a spreadsheet, a graphics package, and a information management system. The information management system capability of Lotus 1-2-3 has been used to develop a database of the Laramie County roadway inventory data. The data is set up on a spreadsheet that is 16 cells wide and of varying length. The maximum size spreadsheet allowed is 256 cells wide by 2048 cells long. The width of 16 cells has been used to allow the data to be printed out on 15" wide paper while in condensed print.

Files for the roadway inventory are stored on 5-1/4" floppy discs by road number in Ascending order. For more detailed instructions than listed hereafter, refer to the "Lotus 1-2-3" manual.

B-2 Data Access

The following is a brief discussion of how to run the Lotus 1-2-3 software on an IBM personal computer:

1. Turn on the IBM PC.
2. Insert the Lotus 1-2-3 system disk into Drive A.
3. Insert the Data disk into Drive B.
4. Enter the date and press 'Enter' key.
5. Enter the time and press 'Enter' key.
6. The Lotus Access System screen is displayed with 1-2-3 highlighted. Press the 'Enter' key.
7. The Lotus Copyright screen is displayed.
8. Press any key to continue.
9. The Lotus spreadsheet now appears on the screen with the rows and columns displayed.
10. Press the '/' key.
11. The screen displays a line of command names - 'Worksheet Range Copy Move File Print Graph Data Quit'.
12. Press the 'F' key to invoke the File commands.
13. The screen displays a line of command names - 'Retrieve Save Combine Xtract Erase List Import Directory'.
14. Press the 'R' key to Retrieve a data file.
15. Enter the Name of the Data file (FDATA1.WKS through FDATA32.WKS) that you want to use and press the 'Enter' key. The contents of the data file chosen will be displayed. See data file index for contents of each data file.

B-3 Data Retrieval

1. To arrange the data in different order the Data Sort command should be used. To do this:
2. Press '/' key.
3. Press 'D' for Data commands.
4. Press 'S' for Sort commands.

5. Press 'D' to specify the Data-Range
   (The Data-Range should consist of the entire data file except for the column headings, e.g., A7..P250, etc.).
6. Press 'P' for Primary-Key
   (The Primary-Key is the name of the column heading for the column that you wish to sort, ie. Road No. or Mileline, etc.).
7. Type in the column heading desired.
8. A Secondary-Key is optional if you want to sort the data by two categories. It is used in the same manner as that of the Primary-Key.
9. When either one of the Keys is used the program asks for the order in which the data is to be sorted, press either 'A' or Ascending or 'D' or Descending.
10. After the above steps have been completed, press 'G' for GO, to start the sorting process.

B-4 Data Updating and Display

1. Use the following steps when adding data to a file.
2. Using the Arrow Keys, scroll the screen to where the data is to be added.
3. Press'/'.
4. Press 'W' for worksheet commands.
5. Press 'I' for Insert.
6. Press a 'C' or a 'R' depending upon whether a Column or a Row is to be added.
7. When the Column or Row is added, type in the new data.
8. If a Column or Row of data needs to be deleted, follow steps 2 through 7 except press 'D' for Delete instead of 'I' for Insert.
9. To edit data in a single cell, move the cursor to the cell using the arrow keys and type in the new data. The new data will be entered into the data file upon pressing the 'Enter' key.

Perform the following to save a data file after editing.

10. Press the '/' key.
11. The screen displays a line of command names - 'Worksheet Range Copy Move File Print Graph Data Quit'.
12. Press the 'F' key to invoke the File commands.
13. The screen displays a line of command names - 'Retrieve Save Combine Xtract Erase List Import Directory'.
14. Press the 'S' key to Save the data file.
15. Enter the Name of the data file in which to store the new data or press the 'Enter' key to replace the old data file with the new changed data file.
16. The contents of the Data file will now be saved.

APPENDIX C - TECHNICAL REFERENCES

1. "County Standards - Specifications for Construction of Rural Subdivision Roads and Streets," Laramie County, June 1979.

2. "Design Guide for Local Roads and Streets," Wyoming Highway Department, July 1984.

3. "Development of the California Pavement Management System," California Department of Transportation, October 1978.

4. "Final Environmental Planning Technical Report - Transportation", URS-Berger, January 1984.

5. "Functional Classification," Wyoming Highway Department, July 1980.

6. "Highway Functional Classification - Concepts, Criteria and Procedures," U.S. Department of Transportation, Federal Highway Administration, July 1984.

7. "Inventory and Cost Estimate Report for Peacekeeper - Related Transporter/Erector Routes, Wyoming," URS-Berger, August 1984.

8. "Off-System Bridge Inspection and Inventory," Wyoming Highway Department, 1984.

9. "A Policy on Geometric Design of Highways and Streets," AASHTO, 1984.

APPENDIX D

LARAMIE COUNTY ROAD INVENTORY - 1984

GLOSSARY OF DESCRIPTIVE ITEMS

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Date(3)	Description(4)
1. Accident	31	North Crow Road	112	117	[illegible]	[illegible]	Accident	7-12-21	-1

Notes : (1) Nearest Route Milepost Location
(2) Item Listing
(3) Date of Occurance
(4) Injury (1) or Non-injury (nI)

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Material(3)	Width(4)	R/L(5)	Description(6)
2. Approach	232	Morris Road	120.8	127.7	G & D	3.03	Approach	Gravel	25	L	Private Entry

Notes : (1) Milepost at Center of Approach
(2) Item Listing (Approach = Entry from only one side)
(3) Approach Material (Left Blank if Numbered County Road,Primitive Road,or Undeveloped Road)
(4) Approach Width (Left Blank if Numbered County Road,Primitive Road,or Undeveloped Road)
(5) Right or Left of Roadway (In Direction of Travel)
(6) Type (Private, Commercial, Field, Road No.)

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Material(3)	Width(4)	Diameter(5)	Length(6)	R/L(7)	Description(8)
3. Approach w/Culvert	232	Morris Road	120.8	127.7	G & D	3.41	Approach/Culvert	Gravel/CMP	15	15	18	L	Field Entry

Notes : (1) Milepost at Center of Approach
(2) Item Listing
(3) Approach Material / Culvert Material
(4) Approach Width in Feet
(5) Culvert Diameter in Inches
(6) Culvert Length in Feet
(7) Right or Left of Roadway (In Direction of Travel)
(8) Type (Private, Commercial, Field, Etc.)

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Material(3)	Est. Cover(4)	Description(5)
4. Arch Culvert	232	Morris Road	120.8	127.7	G & D	3.04	Arch Culvert	CMP	1.5	25in x 44in x 70ft - End Fi[illegible]

Notes : (1) Milepost Location
(2) Item Listing
(3) Culvert Material
(4) Estimated Cover (Amps, Feet
(5) Culvert Size (In Inches and Length (Ft)-Significant Condit[illegible] (No Entry Indicates [illegible]

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Material(3)	Width(4)	Length(5)	Description(6,7,8)
5. Bridge	231	Wilson Road	120.8	127.7	County Maint.	2.65	Bridge(Inv)	Concrete			Horse Creek - 16 F
						3.01	Bridge	Concrete	28	51	Unnamed Cr[illegible] - 301 F

Notes : (1) Milepost Location
(2) Item Listing ('Inv' = Inventoried Bridge, Blank = Non-Inventoried Bridge)
(3) Bridge Construction Material
(4) Roadway Travel Width over Bridge, Feet (Left Blank for Non-Inventoried Bridges)
(5) Length of Bridge Abutment to Abutment, Feet (Left Blank for Non-Inventoried Bridges)
(6) For Inventoried Bridges : Name of Stream, Draw - Inventory Access Co Letters
For Non-Inventoried Bridges : Name of Stream, Draw - If Box Culvert, Width (Ft) - Number(s) [illegible]

Item

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Material(3)	Description(4)
[illegible] Cattle Guard	132	[illegible] Road	[illegible]	12[illegible].7	G & [illegible]	[illegible]	[illegible] Guard	Fab. Steel	8x19

Notes : (1) Milepost Location
(2) Item Listing
(3) Cattle Guard Construction (Fab. Steel, Concrete, Timber)
(4) Length Along Roadway Centerline (Ft) x Roadway Width (Ft)

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Material(3)	Diameter(4)	Length(5)	Est. Cover(6)	Description(7)
7. Culvert	[illegible]	[illegible] Road	1[illegible]0.5	12[illegible].7	County Main.	[illegible]	Culvert	CMP	18	52	2	[illegible]

Notes : (1) Milepost Location
(2) Item Listing
(3) Culvert Material (CMP, RCP, Steel, Cast Iron, Etc.)
(4) Culvert Diameter, Inches
(5) Culvert Length, Feet
(6) Estimated Cover (Avg), Feet
(7) Significant Culvert Condition (No Entry Indicates Good Condition)

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Description(3)
[illegible] End Segment	13[illegible]	[illegible] Road	120.5	127.7	County Main.	7.28	End Segment	C.L. Road 138

Notes : (1) Milepost Location
(2) Item Listing
(3) Physical Location Description

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Material(3)	Description(4)
7. Fence	[illegible]	[illegible] Road	[illegible].3	12[illegible].7	G & [illegible]	[illegible]	Fence	B/W	Beg. Fence [illegible] Lt.
	[illegible]	[illegible] Road	12[illegible].5	1[illegible].7	G & [illegible]	[illegible]	Fence	B/W	End Fence ([illegible])

Notes : (1) Milepost Location
(2) Item Listing
(3) Fence Material (B/W = Barbed Wire, W/W = Woven Wire, Wood, Etc.)
(4) Location from Roadway C.L. (Average);
End of Fence (Ref. Back to Milepost Point of Beginning)

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Description(3)
[illegible] Intersection	[illegible]	[illegible] Road	[illegible]	127.[illegible]	County Main.	[illegible]	Intersection	C.L. Road 107 Rt., C.L. Primitive Road Lt.

Notes : (1) Milepost Location
(2) Item Listing (Intersection = Crossing Roadways, Right and Left)
(3) Physical Location Description

Item	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Description(3)
11. Misc.	[illegible]	[illegible] Road	124.8	134.8	County Main.	[illegible]	Misc.	Beg. Wood Guard Post Rt. (No Rail)

Notes : (1) Milepost Location
(2) Item Listing
(3) Description of Non-Standard Items

Item		Example						
	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Description(3)
[illegible] Utility	[illegible]	[illegible] Road	149.0	163.0	[illegible]	[illegible]	U/G Utility	Telephone
	[illegible]	[illegible] Road	149.[illegible]	163.0	[illegible]	[illegible]	O/H Utility	Power Lines

Notes! (1) Milepost Location
(2) Item Listing
(3) Type (Power, Guy Wire, Telephone, Petroleum, Etc.)
List Owner of Buried Petroleum if Available

	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Material(3)	Width(4)	R.O.W.(5)	Description(6)
13. Roadway	[illegible]	Miami Road	120.8	12[illegible].7	6 & D	0.00	Roadway	Gravel	19	60	Beg. at C.L. Road 2[illegible]

Notes : (1) Milepost Location at Beginning of Roadway Segment
(2) Item Listing
(3) Roadway Material
(4) Roadway Travel Width (Avg.), Feet
(5) Right of Way Width, Feet or UND (Undeclared)
(6) Physical Location Description

	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Description(3)
14. R/R Crossing	120	Round Top Road	[illegible]	215	Paved	2.35	R/R [illegible]	Crossing Gate/Flashing Signal/Signs

Notes : (1) Milepost Location
(2) Item Listing
(3) Type (Signs, Flashing Signal, Crossing Gate, Etc.)

	Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost(1)	Item(2)	Description(3)
15. [illegible]-Traffic [illegible]	[illegible]	Miami Road	1[illegible].8	12[illegible].7	6 & D	0.00	Traffic Sign	Stop Sign 22Ft. Lt. - Poor Cond.

Notes : (1) Milepost Location
(2) Item Listing (Traffic, Road, Etc.)
(3) Sign Description, Distance from Roadway Centerline-Significant
Condition (No Entry Indicates Good Condition)

APPENDIX E

SAMPLE OF 1984 LARAMIE COUNTY ROAD

INVENTORY DATA BASE OUTPUT

Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost	Item	Material	Width	Diameter	Length	Est.Cover	Date	R/L	L.O.W.	Description
101	North Crow Road	213.0	217.0	County Maint.	-0.01	road sign							1		Road 101 sign 24ft Lt
101	North Crow Road	213.0	217.0	County Maint.	0.00	Roadway	gravel	18							beg. @ N. ROW fence of Hwy 210
101	North Crow Road	213.0	217.0	County Maint.	0.00	cattle guard	fab steel								8:26
101	North Crow Road	213.0	217.0	County Maint.	0.38	fence	b/w						1		beg. fence 54ft Lt
101	North Crow Road	213.0	217.0	County Maint.	0.83	culvert	cmp		36	24	1.0				
101	North Crow Road	213.0	217.0	County Maint.	1.00	cattle guard	fab steel								2:09
101	North Crow Road	213.0	217.0	County Maint.	1.00	fence	b/w						1		end fence Lt (0.33)
101	North Crow Road	213.0	217.0	County Maint.	1.09	fence	b/w						r		beg. fence 43ft Rt
101	North Crow Road	213.0	217.0	County Maint.	1.47	approach							r		primitive road Rt
101	North Crow Road	213.0	217.0	County Maint.	1.47	fence	b/w						r		end fence Rt (1.09)
101	North Crow Road	213.0	217.0	County Maint.	1.47	Roadway	gravel	14							
101	North Crow Road	213.0	217.0	County Maint.	2.28	culvert									needs culvert-18" rd rutted
101	North Crow Road	213.0	217.0	County Maint.	2.30	accident						07-22-81			NI
101	North Crow Road	213.0	217.0	County Maint.	2.92	approach	gravel	20					1		field entry
101	North Crow Road	213.0	217.0	County Maint.	3.12	cattle guard	fab steel								7:0
101	North Crow Road	213.0	217.0	County Maint.	3.28	approach	gravel	25					1		field entry
101	North Crow Road	213.0	217.0	County Maint.	3.30	accident						06-13-81			I
101	North Crow Road	213.0	217.0	County Maint.	3.36	culvert	cmp		48	18	6.0				needs additional culvert
101	North Crow Road	213.0	217.0	County Maint.	3.36	approach	gravel	25					r		field entry
101	North Crow Road	213.0	217.0	County Maint.	3.36	Roadway	gravel	12							
101	North Crow Road	213.0	217.0	County Maint.	3.46	approach	gravel	20					r		field entry
101	North Crow Road	213.0	217.0	County Maint.	3.66	approach	gravel	20					1		field entry
101	North Crow Road	213.0	217.0	County Maint.	3.81	fence	b/w						r		beg. fence 2eft Rt
101	North Crow Road	213.0	217.0	County Maint.	3.97	fence	b/w						r		end fence Rt (3.81)
101	North Crow Road	213.0	217.0	County Maint.	4.37	cattle guard	wood								8:12
101	North Crow Road	213.0	217.0	County Maint.	4.37	end segment									end @ cattle guard
102	Harriman Road	200.0	204.0	G&D	0.00	Roadway	gravel	24						80	beg. @ State Line
102	Harriman Road	200.0	204.0	G&D	0.00	traffic sign							1		State Line sign 30ft Lt
102	Harriman Road	200.0	204.0	G&D	0.00	traffic sign							r		load limit 7 tons per axle sign 25ft Rt
102	Harriman Road	200.0	204.0	G&D	0.00	fence	b/w						r		beg. fence 27ft Rt
102	Harriman Road	200.0	204.0	G&D	0.00	fence	b/w						1		beg. fence 5eft Lt
102	Harriman Road	200.0	204.0	G&D	0.18	culvert	cmp		36	30	2.5				dbl culvert
102	Harriman Road	200.0	204.0	G&D	0.22	o/h utility									power lines
102	Harriman Road	200.0	204.0	G&D	0.24	fence	b/w						r		end fence Rt (0.09)
102	Harriman Road	200.0	204.0	G&D	0.24	approach							r		Harriman Dr Rt
102	Harriman Road	200.0	204.0	G&D	0.25	road sign							r		Harriman Dr sign 22ft Rt
102	Harriman Road	200.0	204.0	G&D	0.25	culvert	cmp		12	34	0.5				
102	Harriman Road	200.0	204.0	G&D	0.26	approach	gravel	16					1		field entry
102	Harriman Road	200.0	204.0	G&D	0.27	u/g utility									telephone
102	Harriman Road	200.0	204.0	G&D	0.27	approach	gravel	15					r		commercial entry
102	Harriman Road	200.0	204.0	G&D	0.30	fence	rail						r		beg. fence 70ft Rt
102	Harriman Road	200.0	204.0	G&D	0.40	culvert	cmp		24	34	1.5				
102	Harriman Road	200.0	204.0	G&D	0.47	approach	gravel	25					r		private entry
102	Harriman Road	200.0	204.0	G&D	0.48	traffic sign							r		R/R crossing sign 14ft Rt
102	Harriman Road	200.0	204.0	G&D	0.53	fence	rail						r		end fence Rt (0.33)
102	Harriman Road	200.0	204.0	G&D	0.53	fence	b/w						r		beg. fence 2eft Rt
102	Harriman Road	200.0	204.0	G&D	0.56	traffic sign							1		winding road sign 24ft Lt
102	Harriman Road	200.0	204.0	G&D	0.58	R/R crossing									controlled crossing
102	Harriman Road	200.0	204.0	G&D	0.59	o/h utility									telephone
102	Harriman Road	200.0	204.0	G&D	0.59	o/h utility									power lines
102	Harriman Road	200.0	204.0	G&D	0.60	approach	gravel	30					r		commercial entry
102	Harriman Road	200.0	204.0	G&D	0.60	approach	gravel	30					1		commercial entry
102	Harriman Road	200.0	204.0	G&D	0.69	traffic sign							1		R/R crossing sign 22ft Lt
102	Harriman Road	200.0	204.0	G&D	0.85	approach	gravel	60					1		private entry
102	Harriman Road	200.0	204.0	G&D	0.93	o/h utility									power lines
102	Harriman Road	200.0	204.0	G&D	1.30	accident						06-21-80			NI
102	Harriman Road	200.0	204.0	G&D	1.60	culvert	cmp		18	60	10.0				
102	Harriman Road	200.0	204.0	G&D	1.67	approach	gravel	15					r		field entry
102	Harriman Road	200.0	204.0	G&D	1.89	culvert	cmp		15	34	1.0				
102	Harriman Road	200.0	204.0	G&D	2.17	traffic sign							1		curve left sign 2eft Lt
102	Harriman Road	200.0	204.0	G&D	2.40	approach	gravel	30					r		private entry
102	Harriman Road	200.0	204.0	G&D	2.53	o/h utility									power lines
102	Harriman Road	200.0	204.0	G&D	2.53	fence	b/w						r		cont. fence 35ft Rt (0.53)
102	Harriman Road	200.0	204.0	G&D	2.53	fence	b/w						1		cont. fence 35ft Lt (0.53)
102	Harriman Road	200.0	204.0	G&D	2.57	traffic sign							r		winding road sign 33ft Rt
102	Harriman Road	200.0	204.0	G&D	2.63	culvert	cmp		15	36	1.5				
102	Harriman Road	200.0	204.0	G&D	2.73	traffic sign							r		open range sign 33ft Rt
102	Harriman Road	200.0	204.0	G&D	2.85	traffic sign							1		winding road sign 24ft Lt
102	Harriman Road	200.0	204.0	G&D	2.89	culvert	cmp		24	60	4.0				
102	Harriman Road	200.0	204.0	G&D	2.92	traffic sign							r		curve left sign 2eft Rt
102	Harriman Road	200.0	204.0	G&D	2.96	approach							1		Road 202 Lt
102	Harriman Road	200.0	204.0	G&D	2.99	road sign							1		Road 202 sign 30ft Lt
102	Harriman Road	200.0	204.0	G&D	3.07	o/h utility									power lines
102	Harriman Road	200.0	204.0	G&D	3.15	traffic sign							1		curve right 38ft Lt
102	Harriman Road	200.0	204.0	G&D	3.29	traffic sign							r		curve right 23ft Rt
102	Harriman Road	200.0	204.0	G&D	3.37	o/h utility									high voltage
102	Harriman Road	200.0	204.0	G&D	3.37	approach	gravel	60					1		commercial entry
102	Harriman Road	200.0	204.0	G&D	3.55	traffic sign							1		curve left sign 27ft Lt

Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost	Item	Material	Width	Diameter	Length	Est.Cover	Date	R/L	R.O.W.	Description
102	Harriman Road	200.0	204.0	G&D	3.97	approach	gravel	60					1		field entry
102	Harriman Road	200.0	204.0	G&D	4.02	o/h utility									power lines
102	Harriman Road	200.0	204.0	G&D	4.04	traffic sign							1		curve left sign 38ft Lt
102	Harriman Road	200.0	204.0	G&D	4.06	traffic sign							r		curve left sign 25ft Rt
102	Harriman Road	200.0	204.0	G&D	4.11	o/h utility									power lines
102	Harriman Road	200.0	204.0	G&D	4.21	traffic sign							1		curve right sign 33ft Lt
102	Harriman Road	200.0	204.0	G&D	4.23	traffic sign							r		curve right sign 25ft Rt
102	Harriman Road	200.0	204.0	G&D	4.28	approach	gravel	25					r		commercial entry
102	Harriman Road	200.0	204.0	G&D	4.48	culvert	cmp		15	40	0.5				
102	Harriman Road	200.0	204.0	G&D	4.54	traffic sign							r		curve right sign 38ft Rt
102	Harriman Road	200.0	204.0	G&D	4.60	approach	gravel	80					1		private entry
102	Harriman Road	200.0	204.0	G&D	4.62	traffic sign							1		curve right sign 26ft Lt
102	Harriman Road	200.0	204.0	G&D	4.86	culvert	cmp		30	38	0.8				dbl culvert
102	Harriman Road	200.0	204.0	G&D	4.93	o/h utility									power lines
102	Harriman Road	200.0	204.0	G&D	5.02	traffic sign							1		open range sign 25ft Lt
102	Harriman Road	200.0	204.0	G&D	5.08	culvert	cmp		30	36	0.5				
102	Harriman Road	200.0	204.0	G&D	5.35	culvert	cmp		24	36	0.5				
102	Harriman Road	200.0	204.0	G&D	5.50	o/h utility									power lines
102	Harriman Road	200.0	204.0	G&D	5.93	Roadway	paved								beg. pavement St. Hwy 218
102	Harriman Road	200.0	204.0	G&D	5.93	road sign							1		load limit 7 tons per axle sign 29ft Lt
102	Harriman Road	200.0	204.0	G&D	5.93	end segment									end @ pavement St. Hwy 218
103	Road 103	206.4	207.0	County Maint.	0.00	Roadway	paved	24						UND	beg. @ barrier on road
103	Road 103	206.4	207.0	County Maint.	0.00	approach	dirt	14					1		private entry
103	Road 103	206.4	207.0	County Maint.	0.02	o/h utility									telephone
103	Road 103	206.4	207.0	County Maint.	0.41	approach	gravel	20					1		field entry
103	Road 103	206.4	207.0	County Maint.	0.41	misc									phone pedistals (3) 6' from pavement
103	Road 103	206.4	207.0	County Maint.	0.80	approach							1		Road 206 Lt
103	Road 103	206.4	207.0	County Maint.	0.81	road sign							1		Road 206 sign 32ft Lt
103	Road 103	206.4	207.0	County Maint.	1.03	o/h utility									telephone
103	Road 103	206.4	207.0	County Maint.	1.05	R/R crossing									UPRR overpass
103	Road 103	206.4	207.0	County Maint.	1.06	fence	b/w						1		beg. fence 80ft Lt
103	Road 103	206.4	207.0	County Maint.	1.06	fence	b/w						r		beg. fence 70ft Rt
103	Road 103	206.4	207.0	County Maint.	1.06	o/h utility									telephone
103	Road 103	206.4	207.0	County Maint.	1.06	o/h utility									power lines
103	Road 103	206.4	207.0	County Maint.	1.07	approach	gravel	20					1		commercial entry
103	Road 103	206.4	207.0	County Maint.	1.07	approach	gravel	20					r		commercial entry
103	Road 103	206.4	207.0	County Maint.	1.14	fence	b/w						r		end fence Rt (1.06)
103	Road 103	206.4	207.0	County Maint.	1.14	fence	b/w						1		end fence Lt (1.06)
103	Road 103	206.4	207.0	County Maint.	1.14	cattle guard	fab steel								8x24
103	Road 103	206.4	207.0	County Maint.	1.14	end segment									end @ cattle guard
103	Road 103	207.1	207.6	County Maint.	0.00	Roadway	gravel	14						UND	beg. @ N. ROW fence I-80
103	Road 103	207.1	207.6	County Maint.	0.00	cattle guard	fab steel								8x12
103	Road 103	207.1	207.6	County Maint.	0.14	culvert	cmp		15	18	0.5				
103	Road 103	207.1	207.6	County Maint.	0.37	culvert	cmp		18	40	2.0				
103	Road 103	207.1	207.6	County Maint.	0.37	o/h utility									telephone lines
103	Road 103	207.1	207.6	County Maint.	0.45	culvert	cmp		15	20	0.5				
103	Road 103	207.1	207.6	County Maint.	0.46	culvert	cmp		18	18	0.5				
103	Road 103	207.1	207.6	County Maint.	0.46	end segment									end @ culvert
103	McLees Road	237.5	241.0	G&D	0.00	Roadway	gravel	14						80	beg. @ stop sign St. Hwy. 211
103	McLees Road	237.5	241.0	G&D	0.00	traffic sign							1		stop sign 40ft Lt
103	McLees Road	237.5	241.0	G&D	0.01	u/g utility									telephone cable
103	McLees Road	237.5	241.0	G&D	0.35	approach w/culvert	gvl/cmp	25	15	26			1		field entry
103	McLees Road	237.5	241.0	G&D	0.40	culvert	cmp		60	60	6.0				triple culvert
103	McLees Road	237.5	241.0	G&D	0.48	traffic sign							r		R/R crossing sign 15ft Rt
103	McLees Road	237.5	241.0	G&D	0.53	cattle guard	fab steel								7x12
103	McLees Road	237.5	241.0	G&D	0.55	R/R crossing									controlled crossing gate
103	McLees Road	237.5	241.0	G&D	0.56	o/h utility									power lines
103	McLees Road	237.5	241.0	G&D	0.56	fence	b/w						1		beg. fence 30ft Lt
103	McLees Road	237.5	241.0	G&D	0.57	approach	gravel	60					1		Road 237 Lt
103	McLees Road	237.5	241.0	G&D	0.59	approach	gravel	20					r		commercial entry
103	McLees Road	237.5	241.0	G&D	0.61	traffic sign							r		R/R crossing sign 15ft Lt
103	McLees Road	237.5	241.0	G&D	0.64	o/h utility									power lines
103	McLees Road	237.5	241.0	G&D	0.65	o/h utility									power lines
103	McLees Road	237.5	241.0	G&D	0.75	cattle guard	fab steel								8x12
103	McLees Road	237.5	241.0	G&D	0.81	o/h utility									power lines
103	McLees Road	237.5	241.0	G&D	0.86	fence	b/w						1		end fence Lt (0.56)
103	McLees Road	237.5	241.0	G&D	0.88	culvert	cmp		36	36	2.0				
103	McLees Road	237.5	241.0	G&D	0.92	culvert	cmp		15	30	1.0				
103	McLees Road	237.5	241.0	G&D	1.21	culvert	cmp		12	30	0.5				
103	McLees Road	237.5	241.0	G&D	1.36	approach							r		Kelly Rd Rt
103	McLees Road	237.5	241.0	G&D	1.61	culvert	cmp		15	24	0.3				
103	McLees Road	237.5	241.0	G&D	2.09	cattle guard	fab steel								8x10
103	McLees Road	237.5	241.0	G&D	2.20	bridge (Inv.)	conc.								middle fk Chugwater Cr.
103	McLees Road	237.5	241.0	G&D	2.49	approach							1		Road 239 Lt
103	McLees Road	237.5	241.0	G&D	2.51	road sign							r		Road 239 sign 23ft Rt
103	McLees Road	237.5	241.0	G&D	2.54	cattle guard	fab steel								8x10
103	McLees Road	237.5	241.0	G&D	2.98	cattle guard	fab steel								8x10

Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost	Item	Material	Width	Diameter	Length	Est.Cover	Date	R/L	R.O.W.	Description
103	McLees Road	237.5	241.0	G&D	3.67	cattle guard	fab steel								8x8
103	McLees Road	237.5	241.0	G&D	3.92	o/h utility									power lines
103	McLees Road	237.5	241.0	G&D	4.02	o/h utility									power lines
103	McLees Road	237.5	241.0	G&D	4.25	fence	b/w						r		beg. fence 14ft Rt
103	McLees Road	237.5	241.0	G&D	4.31	fence	b/w						l		beg. fence 14ft Lt
103	McLees Road	237.5	241.0	G&D	4.40	fence	b/w						r		end fence Rt (4.25)
103	McLees Road	237.5	241.0	G&D	4.40	fence	b/w						l		end fence Lt (4.31)
103	McLees Road	237.5	241.0	G&D	4.40	end segment									*end @ fence corners*
106	Red Canyon Road	210.5	212.1	G&D	0.00	Roadway	gravel							UND	beg. @ Cl Road 210
106	Red Canyon Road	210.5	212.1	G&D	0.02	cattle guard	fab steel								7x10
106	Red Canyon Road	210.5	212.1	G&D	0.02	fence	b/w						r		beg. fence 35ft Rt
106	Red Canyon Road	210.5	212.1	G&D	0.02	fence	b/w						l		beg. fence 25ft Lt
106	Red Canyon Road	210.5	212.1	G&D	0.02	culvert	cmp		36	38	2.0				
106	Red Canyon Road	210.5	212.1	G&D	0.03	culvert	cmp		36	30	2.5				twin culvert
106	Red Canyon Road	210.5	212.1	G&D	0.03	culvert	cmp		36	42	2.5				
106	Red Canyon Road	210.5	212.1	G&D	0.06	misc									beg. Ranch operations
106	Red Canyon Road	210.5	212.1	G&D	0.09	o/h utility									power lines
106	Red Canyon Road	210.5	212.1	G&D	0.10	o/h utility									telephone
106	Red Canyon Road	210.5	212.1	G&D	0.14	misc									end Ranch operations
106	Red Canyon Road	210.5	212.1	G&D	0.17	fence	b/w						r		end fence Rt (0.02)
106	Red Canyon Road	210.5	212.1	G&D	0.21	traffic sign							r		open range 15ft Rt
106	Red Canyon Road	210.5	212.1	G&D	0.52	cattle guard	fab steel								7x10
106	Red Canyon Road	210.5	212.1	G&D	0.53	fence	b/w						l		end fence Lt (0.02)
106	Red Canyon Road	210.5	212.1	G&D	1.25	fence	b/w						r		beg. fence 23ft Rt
106	Red Canyon Road	210.5	212.1	G&D	1.54	o/h utility									power lines
106	Red Canyon Road	210.5	212.1	G&D	1.86	traffic sign							l		open range sign 20ft Lt
106	Red Canyon Road	210.5	212.1	G&D	1.88	cattle guard	fab steel								8x12
106	Red Canyon Road	210.5	212.1	G&D	1.88	fence	b/w						r		end fence Rt (1.25)
106	Red Canyon Road	210.5	212.1	G&D	1.88	end segment									*end @ S. ROW fence Wyo 210*
106	Jordan Road	241.7	245.0	Paved Road	0.00	Roadway	asphalt	24						UND	beg. @ cattle guard on St. Hwy 211
106	Jordan Road	241.7	245.0	Paved Road	0.00	cattle guard	fab steel								8x12
106	Jordan Road	241.7	245.0	Paved Road	0.04	misc							l		beg bridge guard rail Lt
106	Jordan Road	241.7	245.0	Paved Road	0.04	misc							r		beg bridge guard rail Rt
106	Jordan Road	241.7	245.0	Paved Road	0.07	traffic sign							l		R/R crossing sign 18ft Lt
106	Jordan Road	241.7	245.0	Paved Road	0.09	bridge	conc.								24ft w-Chugwater Cr
106	Jordan Road	241.7	245.0	Paved Road	0.11	misc							r		end bridge guard rail Rt (0.04)
106	Jordan Road	241.7	245.0	Paved Road	0.12	o/h utility									power lines
106	Jordan Road	241.7	245.0	Paved Road	0.15	misc							l		end bridge guard rail Lt (0.04)
106	Jordan Road	241.7	245.0	Paved Road	0.24	traffic sign							l		dir. arrow sign Rt turn 18ft Lt
106	Jordan Road	241.7	245.0	Paved Road	0.27	traffic sign							l		dir. arrow sign Lt turn 20ft Lt
106	Jordan Road	241.7	245.0	Paved Road	0.30	traffic sign							r		slow sign 20ft Rt
106	Jordan Road	241.7	245.0	Paved Road	0.30	cattle guard	fab steel								8x24
106	Jordan Road	241.7	245.0	Paved Road	0.31	traffic sign							r		to Chugwater sign arrow Rt 18' Rt
106	Jordan Road	241.7	245.0	Paved Road	0.33	traffic sign							l		to Cheyenne sign arrow Lt 60' Lt
106	Jordan Road	241.7	245.0	Paved Road	0.33	approach	gravel	16					l		private Rd
106	Jordan Road	241.7	245.0	Paved Road	0.35	o/h utility									power lines
106	Jordan Road	241.7	245.0	Paved Road	0.36	o/h utility									power lines
106	Jordan Road	241.7	245.0	Paved Road	0.37	o/h utility									power lines
106	Jordan Road	241.7	245.0	G&D	0.39	Roadway	gravel	18							end pavement beg. gravel
106	Jordan Road	241.7	245.0	G&D	0.42	culvert	cmp		30		1.0				*concealed length*
106	Jordan Road	241.7	245.0	G&D	0.42	approach	gravel	30					l		private entry
106	Jordan Road	241.7	245.0	G&D	0.45	fence	b/w						r		beg. fence 32ft Rt
106	Jordan Road	241.7	245.0	G&D	0.47	traffic sign							l		slow sign 18rt Lt
106	Jordan Road	241.7	245.0	G&D	0.48	approach							l		Road 242 Lt
106	Jordan Road	241.7	245.0	G&D	0.49	traffic sign							l		Road 242 sign 19ft Lt
106	Jordan Road	241.7	245.0	G&D	0.52	fence	b/w						l		beg. fence 32ft Lt
106	Jordan Road	241.7	245.0	G&D	0.70	approach	gravel	32					l		field entry
106	Jordan Road	241.7	245.0	G&D	1.00	Roadway	gravel	14							road narrows to 14ft
106	Jordan Road	241.7	245.0	G&D	1.18	culvert	cmp		18	24	1.0				damaged end
106	Jordan Road	241.7	245.0	G&D	1.58	approach	gravel	25					l		field entry
106	Jordan Road	241.7	245.0	G&D	1.59	culvert	cmp		24	36	0.0				
106	Jordan Road	241.7	245.0	G&D	1.70	approach	gravel	25					r		field entry
106	Jordan Road	241.7	245.0	G&D	1.76	culvert	cmp		24	28	0.8				damaged end
106	Jordan Road	241.7	245.0	G&D	2.25	fence	b/w						l		end fence Lt (0.52)
106	Jordan Road	241.7	245.0	G&D	2.53	fence	b/w						l		beg. fence 35ft Lt
106	Jordan Road	241.7	245.0	G&D	2.62	approach	gravel	20					l		field entry
106	Jordan Road	241.7	245.0	G&D	2.82	approach	gravel	20					r		field entry
106	Jordan Road	241.7	245.0	G&D	3.66	cattle guard	fab steel								8x10
106	Jordan Road	241.7	245.0	G&D	3.66	fence	b/w						l		end fence Lt (2.53)
106	Jordan Road	241.7	245.0	G&D	3.83	culvert	cmp		30	28	0.0				
106	Jordan Road	241.7	245.0	G&D	4.08	fence	b/w						r		end fence Rt (0.45)
106	Jordan Road	241.7	245.0	G&D	4.10	culvert	cmp		36	20	1.0				culvert (Chugwater Creek)
106	Jordan Road	241.7	245.0	G&D	4.10	culvert	cmp		48	18	1.0				culvert (Chugwater Ck. needs widening)
106	Jordan Road	241.7	245.0	G&D	4.44	cattle guard	fab steel								8x14
106	Jordan Road	241.7	245.0	G&D	4.44	fence	b/w						l		beg. fence 40ft Lt
106	Jordan Road	241.7	245.0	G&D	4.47	bridge (Inv.)	conc.								Chugwater Creek
106	Jordan Road	241.7	245.0	G&D	4.49	R/R crossing									uncontrolled-warning signs
106	Jordan Road	241.7	245.0	G&D	4.50	o/h utility									telephone

Road No.	Road Name	Mileline	to Mileline	Co.Maint.Class	Milepost	Item	Material	Width	Diameter	Length	Est.Cover	Date	R/L	R.O.W.	Description
106	Jordan Road	241.7	245.0	G&D	4.52	cattle guard	fab steel								8x14
106	Jordan Road	241.7	245.0	G&D	4.57	approach	gravel	20					r		primitive road Rt
106	Jordan Road	241.7	245.0	G&D	4.59	traffic sign							l		R/R crossing sign 12ft Lt
106	Jordan Road	241.7	245.0	G&D	5.16	culvert	none								culvert needed here
106	Jordan Road	241.7	245.0	G&D	5.43	o/h utility									power lines
106	Jordan Road	241.7	245.0	G&D	5.62	approach	gravel	30					l		private entry
106	Jordan Road	241.7	245.0	G&D	5.63	o/h utility									guy wire
106	Jordan Road	241.7	245.0	G&D	5.76	o/h utility									power lines
106	Jordan Road	241.7	245.0	G&D	5.91	o/h utility									power lines
106	Jordan Road	241.7	245.0	G&D	6.21	cattle guard	fab steel								8x10
106	Jordan Road	241.7	245.0	G&D	6.29	fence	b/w						l		end fence Lt (4.44)
106	Jordan Road	241.7	245.0	G&D	6.33	culvert	none								culvert needed here
106	Jordan Road	241.7	245.0	G&D	6.58	culvert	none								culvert needed here
106	Jordan Road	241.7	245.0	G&D	6.87	cattle guard	fab steel								8x10
106	Jordan Road	241.7	245.0	G&D	6.90	o/h utility									power lines
106	Jordan Road	241.7	245.0	G&D	7.10	culvert	none								culvert needed here
106	Jordan Road	241.7	245.0	G&D	7.39	culvert	none								culvert needed here
106	Jordan Road	241.7	245.0	G&D	7.43	approach	gravel	25					l		private entry
106	Jordan Road	241.7	245.0	G&D	7.43	fence	b/w						l		beg. fence 27ft Lt
106	Jordan Road	241.7	245.0	G&D	7.59	o/h utility									power lines
106	Jordan Road	241.7	245.0	G&D	7.67	o/h utility									power lines
106	Jordan Road	241.7	245.0	G&D	7.77	fence	b/w						r		beg. fence 30ft Rt
106	Jordan Road	241.7	245.0	G&D	7.80	o/h utility									power lines
106	Jordan Road	241.7	245.0	G&D	7.81	misc							r		power pole 14ft Rt should relocate
106	Jordan Road	241.7	245.0	G&D	7.81	fence	b/w						l		end fence Lt (7.43)
106	Jordan Road	241.7	245.0	G&D	7.81	fence	b/w								end fence Rt (7.77)
106	Jordan Road	241.7	245.0	G&D	8.12	bridge (Inv.)	conc.	18							Chugwater Cr.
106	Jordan Road	241.7	245.0	G&D	8.12	traffic sign							r		to Cheyenne, to Chugwater 18ft Rt
106	Jordan Road	241.7	245.0	G&D	8.12	approach	gravel	35					r		private entry
106	Jordan Road	241.7	245.0	G&D	8.19	traffic sign							r		R/R crossing sign 11ft Rt
106	Jordan Road	241.7	245.0	G&D	8.20	traffic sign							l		county line sign 10ft Lt
106	Jordan Road	241.7	245.0	G&D	8.20	end segment									end @ cattle guard/Co. Line

PROJECT PARTICIPANTS

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Wyoming Highway Department

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Timothy Carroll, Transportation Engineer

Laramie County

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Pete Hutchison, County Engineer

City of Cheyenne

Brant Williams, Traffic Engineer

Cheyenne - Laramie County Planning Office

James T. Bonds, Director

Cheyenne Area Transportation Planning Process

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Federal Highway Administration

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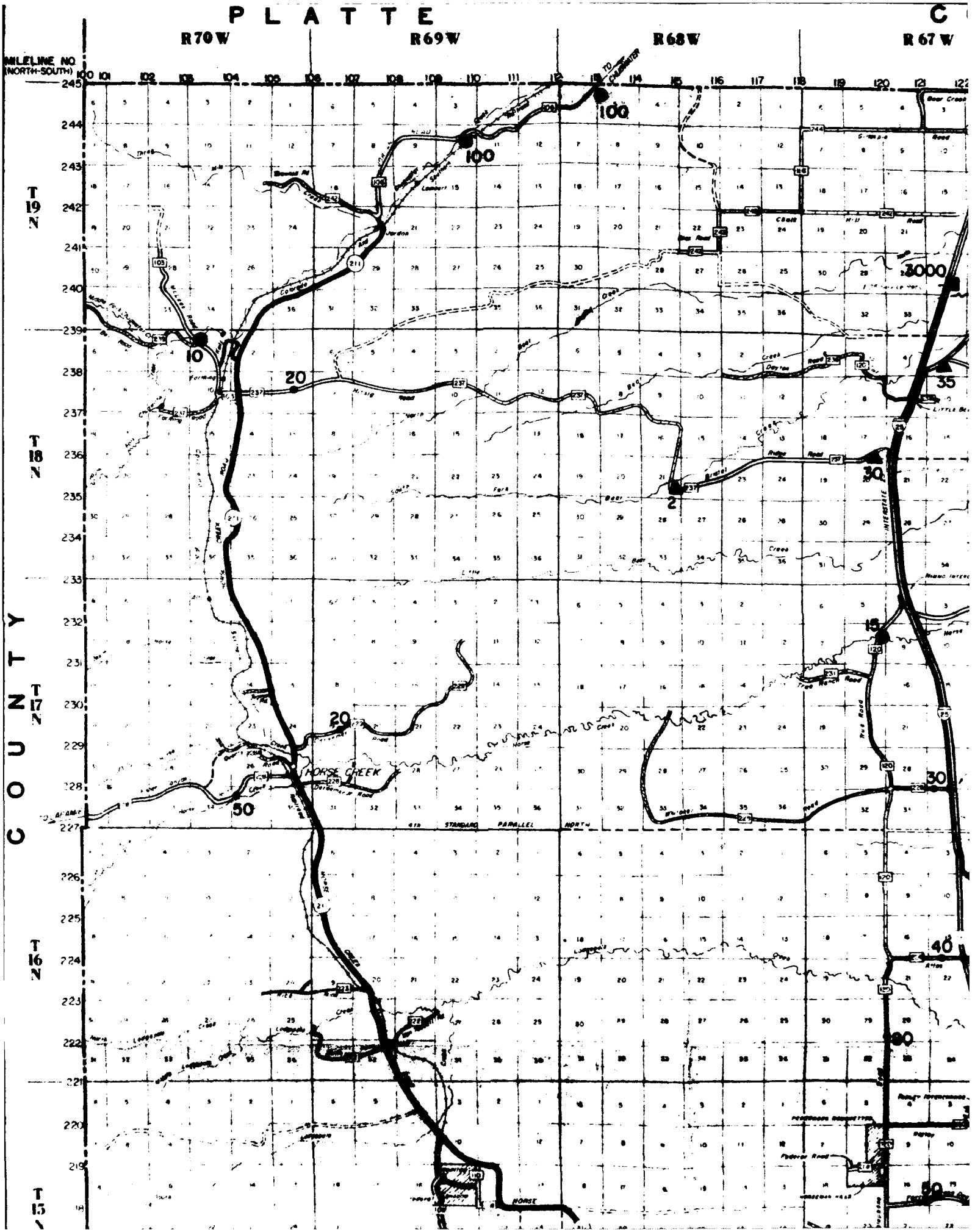
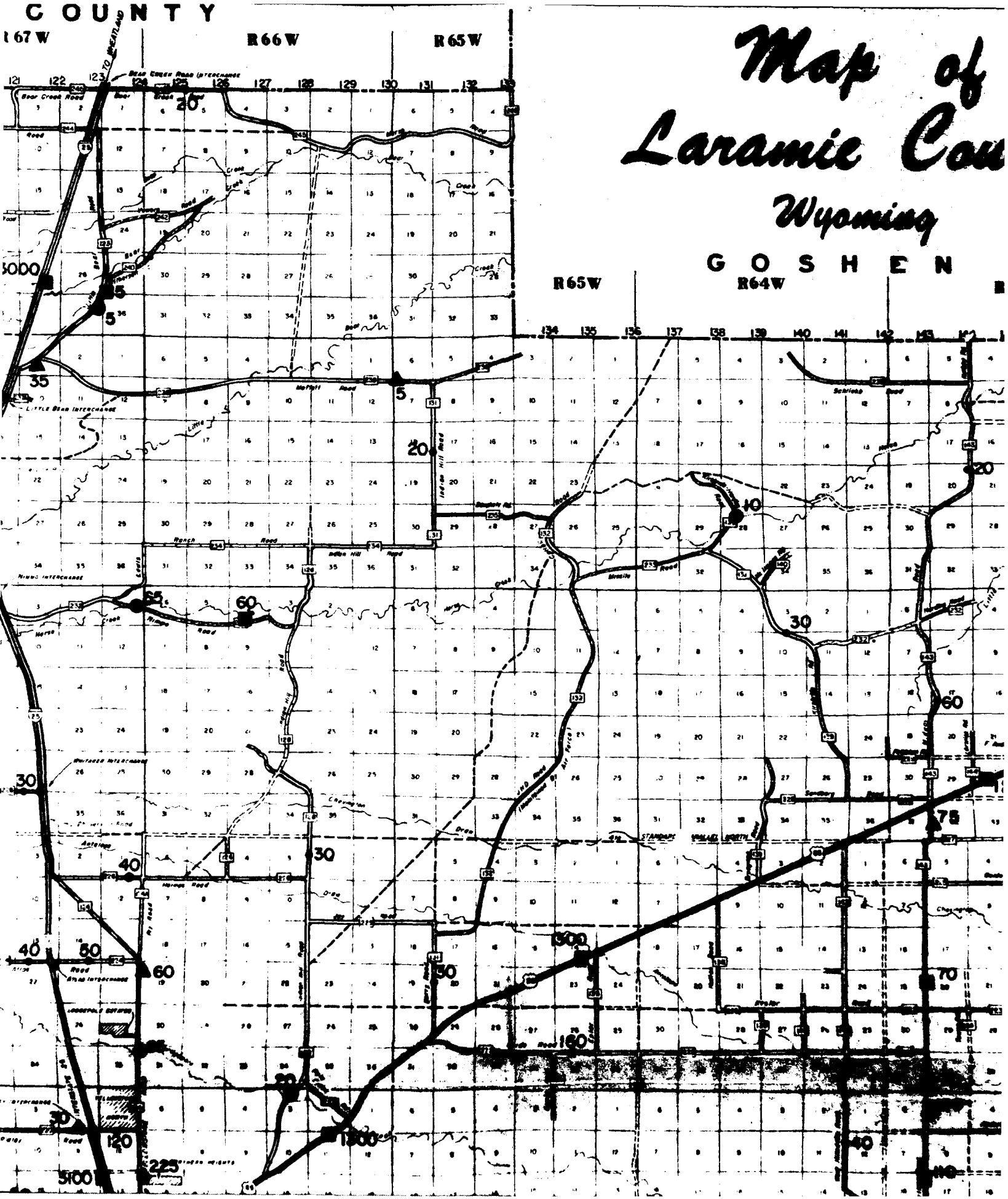
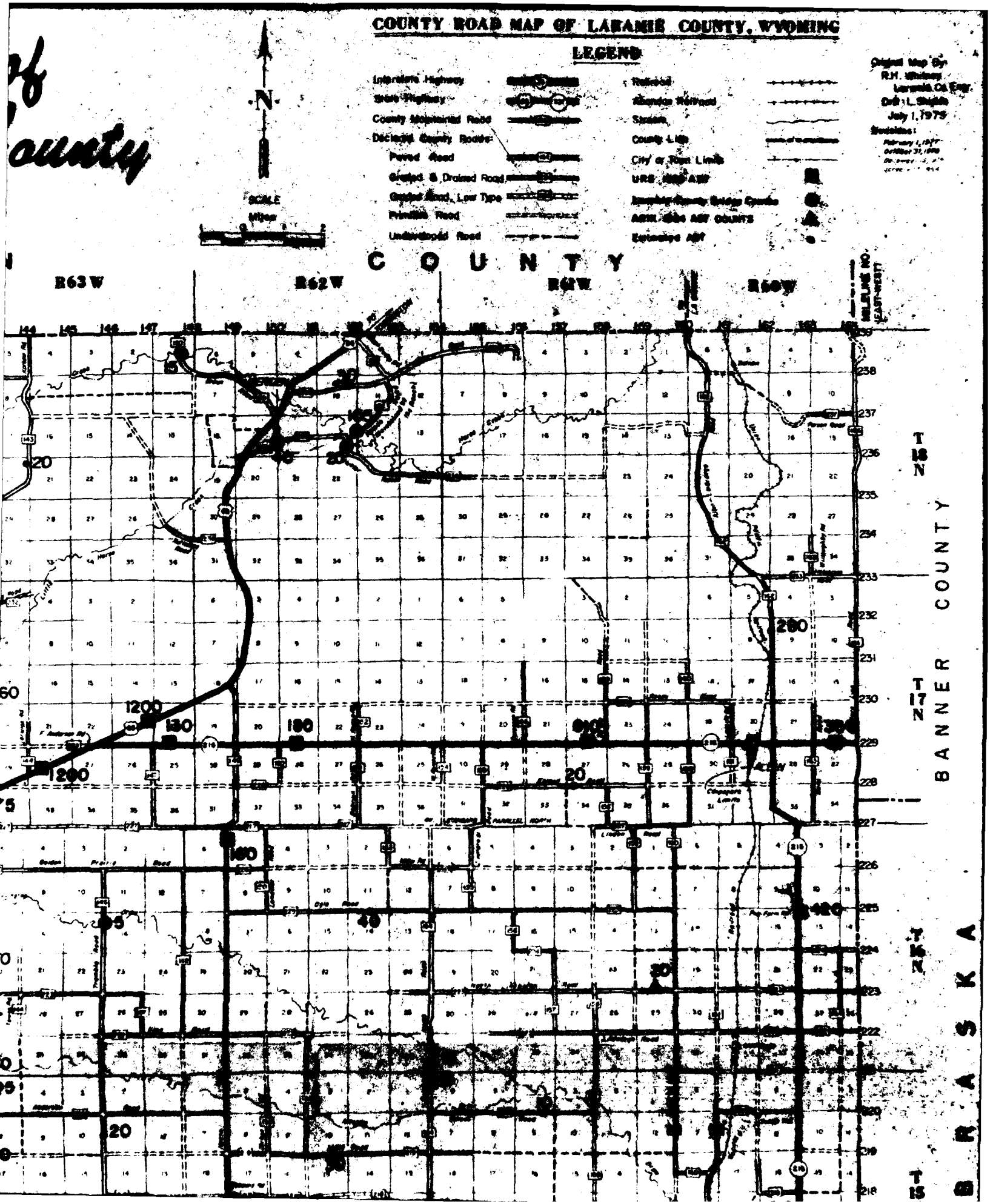
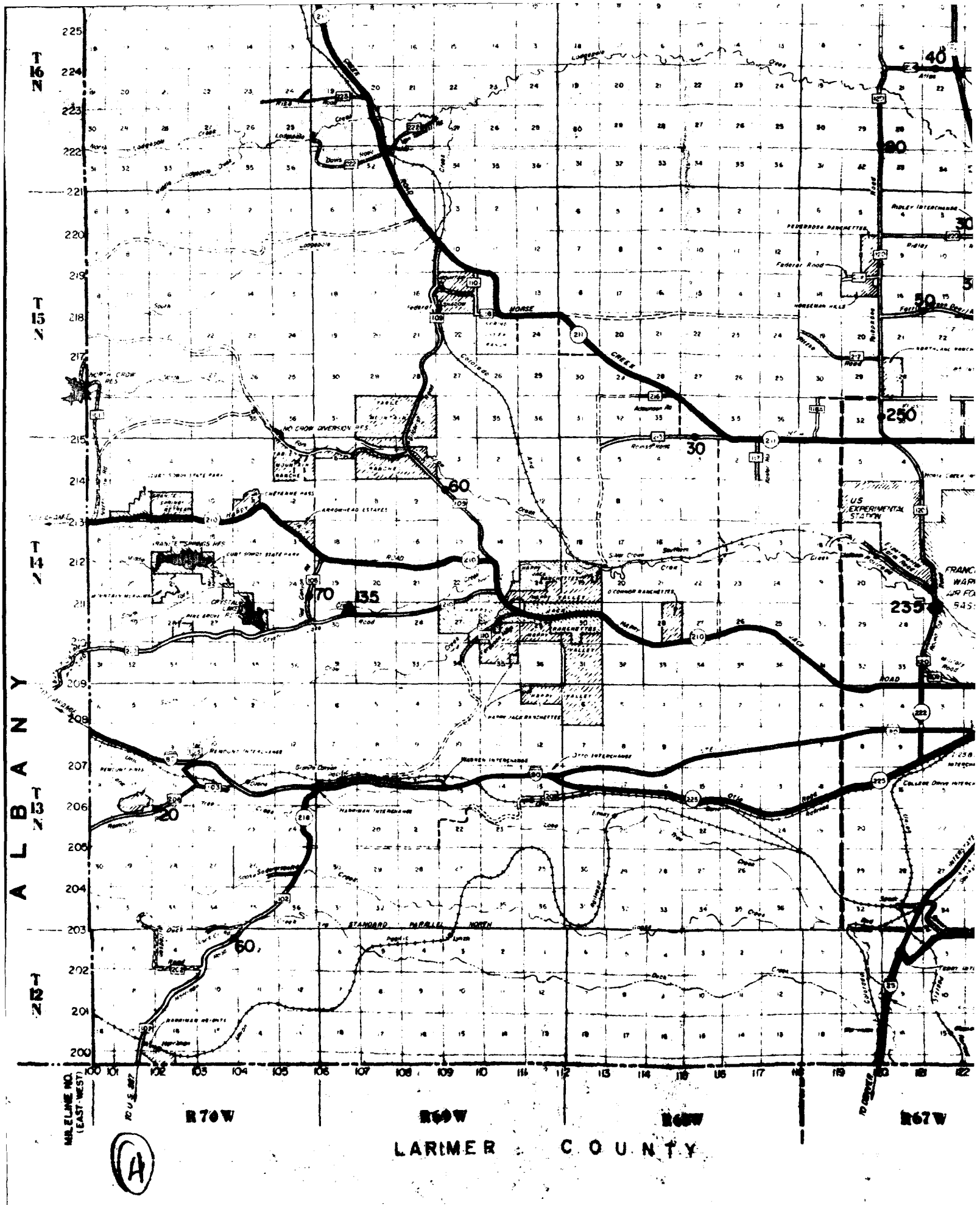
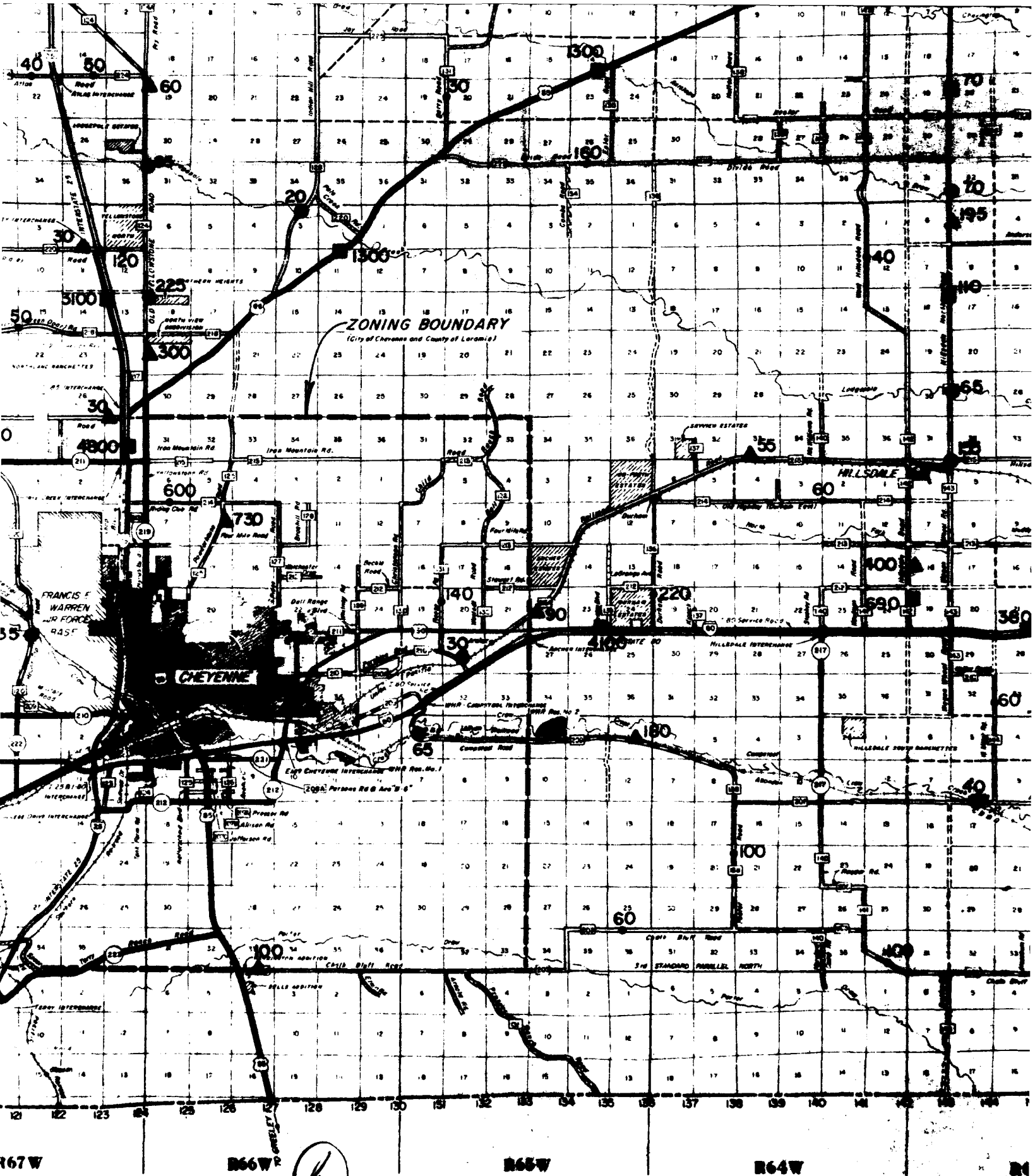
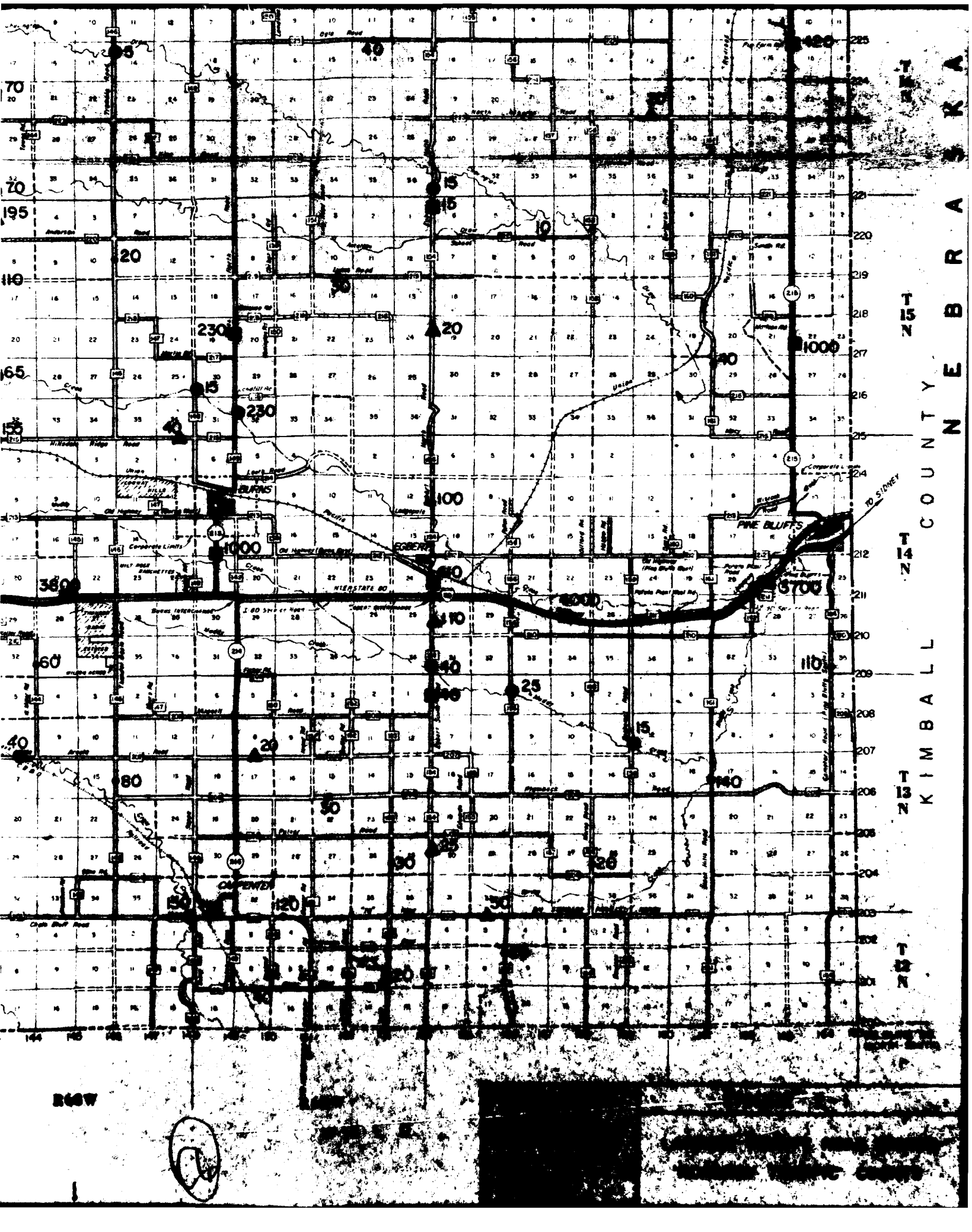

PLATTE
C
R70W
R69W
R68W
R67W
MILELINE NO.
(NORTH-SOUTH)
T 19 N
T 18 N
T 17 N
T 16 N
T 15 N
COUNTY
HORSE CREEK
4th STANDARD PARALLEL NORTH
INTERSTATE
TO CHEYENNE

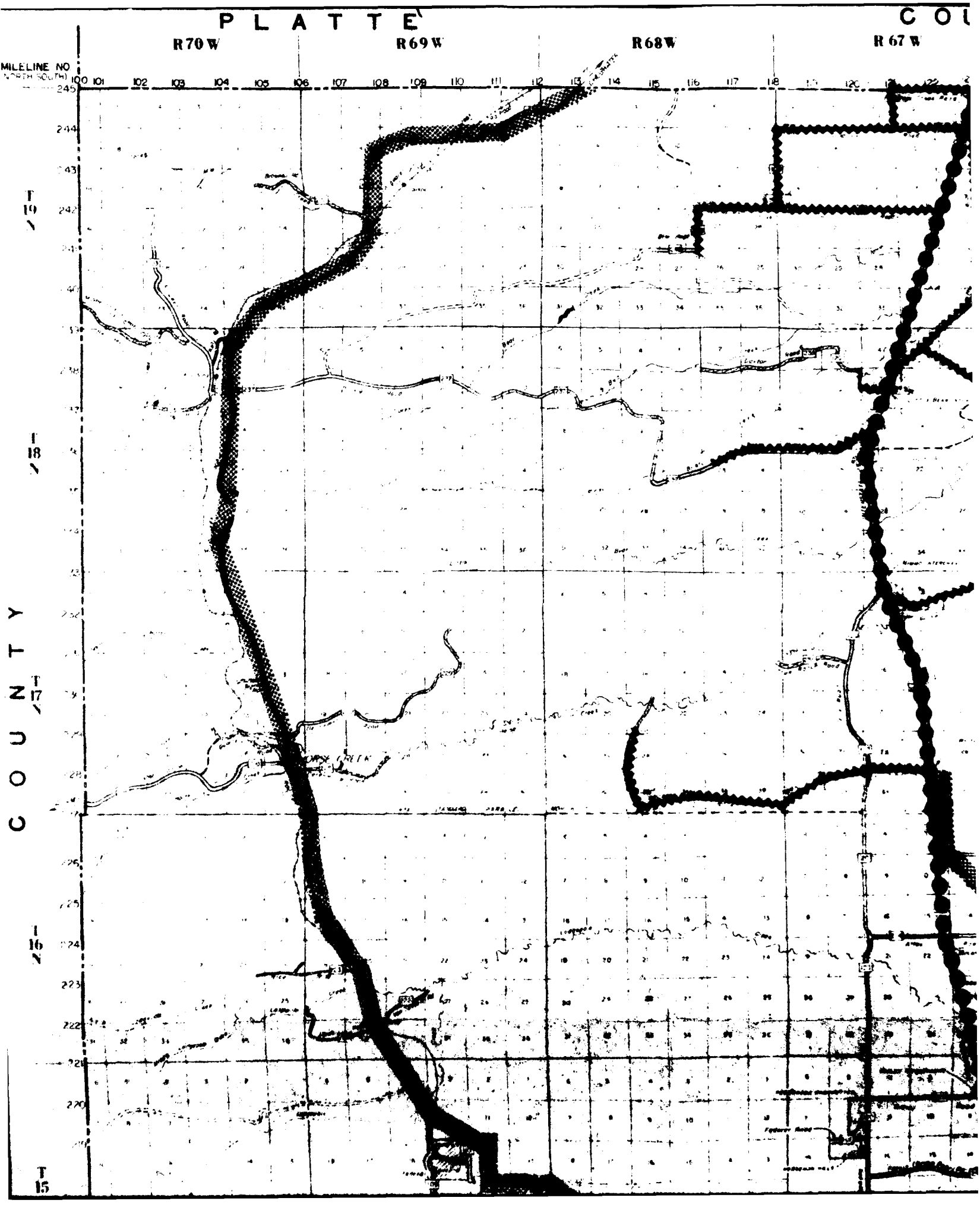

COUNTY
R67W
R66W
R65W
R65W
R64W
GOSHEN
Map of
Laramie Cou
Wyoming
Bear Creek Road Interchange
Little Bear Interchange
Happy Jack Road
Road
Creek
River

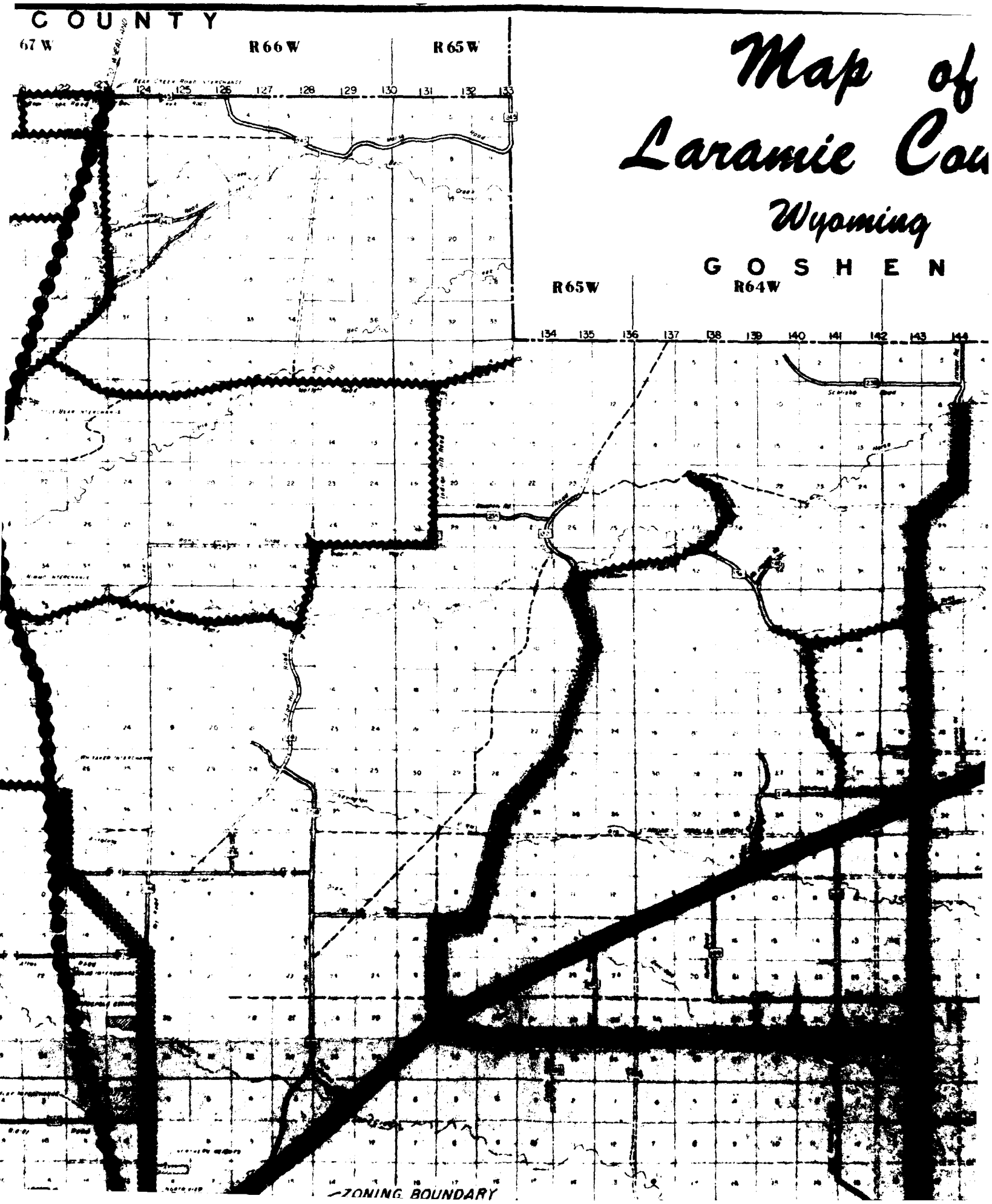

COUNTY ROAD MAP OF LARAMIE COUNTY, WYOMING
LEGEND
Interstate Highway
State Highway
County Maintained Road
Declared County Routes:
Paved Road
Graded & Drained Road
Graded Road, Low Type
Primitive Road
Undeveloped Road
Railroad
Abandon Railroad
Streams
County Line
City or Town Limits
Original Map By
R.H. Whitney
Laramie Co. Engr.
Drawn L. Staples
July 1, 1979
N
SCALE
Miles
C O U N T Y
R63W
R62W
R61W
R60W
T 18 N
T 17 N
T 16 N
T 15 N
BANNER COUNTY
NEBRASKA


T 16 N
T 15 N
T 14 N
T 13 N
T 12 N
ALBANY
R70W
R69W
R68W
R67W
LARIMER COUNTY
(A)


ZONING BOUNDARY
(City of Cheyenne and County of Laramie)
CHEYENNE
FRANCIS E WARREN AIR FORCE BASE
HILLSDALE
R67W
R66W
R65W
R64W
COLORADO


KIMBALL COUNTY
NEBRASKA
T 15 N
T 14 N
T 13 N
T 12 N
R 56 W
BURNS
EGBERT
PINE BLUFFS
CARPENTER
INTERSTATE 80
10 SIDNEY


PLATTE
COUNTY
R70W
R69W
R68W
R67W
MILELINE NO
(NORTH-SOUTH)
100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122
245 244 243 242 241 240 239 238 237 236 235 234 233 232 231 230 229 228 227 226 225 224 223 222 221 220
T 19 N
T 18 N
T 17 N
T 16 N
T 15


COUNTY
67 W
R66W
R65W
Map of
Laramie Cou
Wyoming
GOSHEN
R65W
R64W
ZONING BOUNDARY

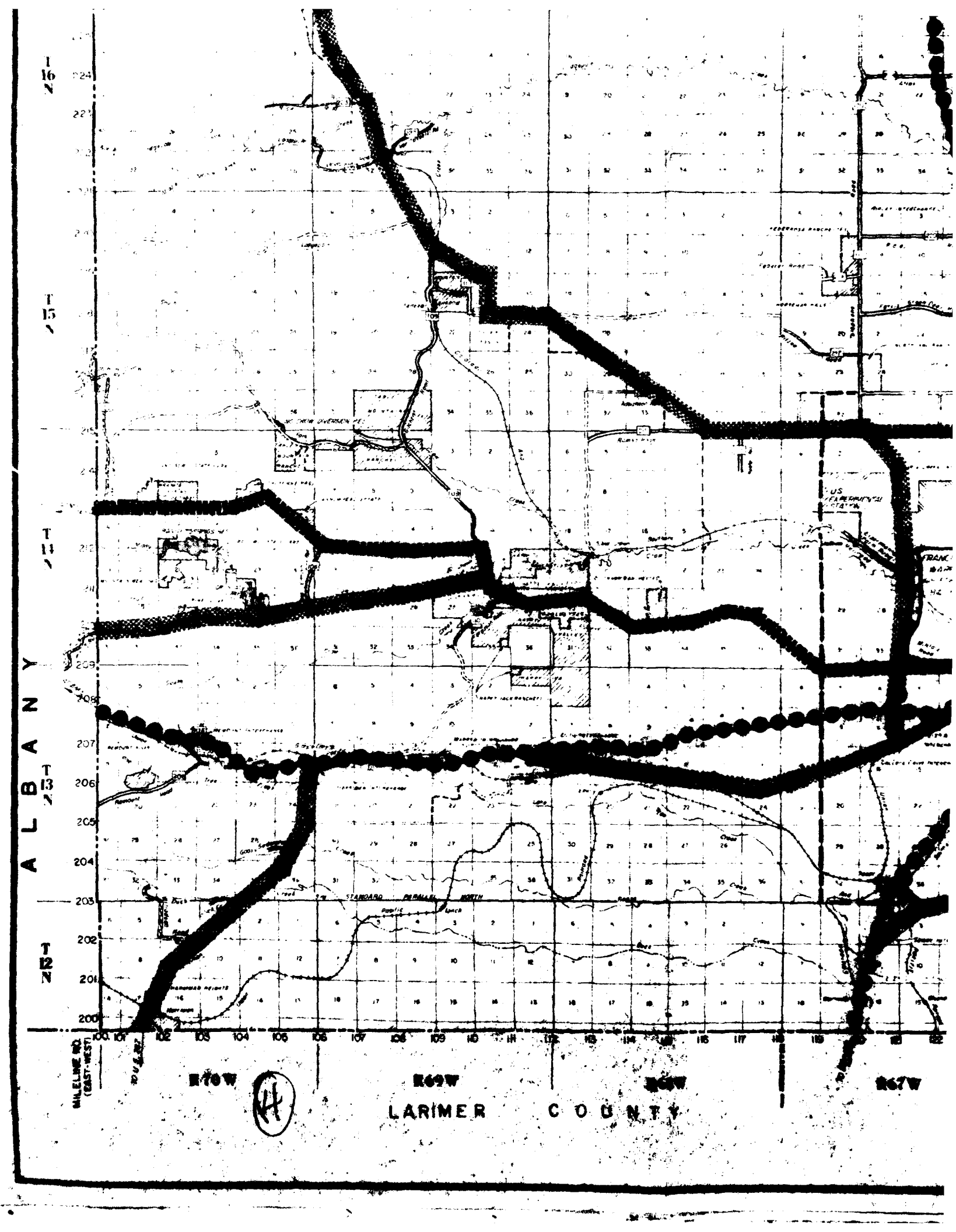
COUNTY ROAD MAP OF LARAMIE COUNTY, WYOMING

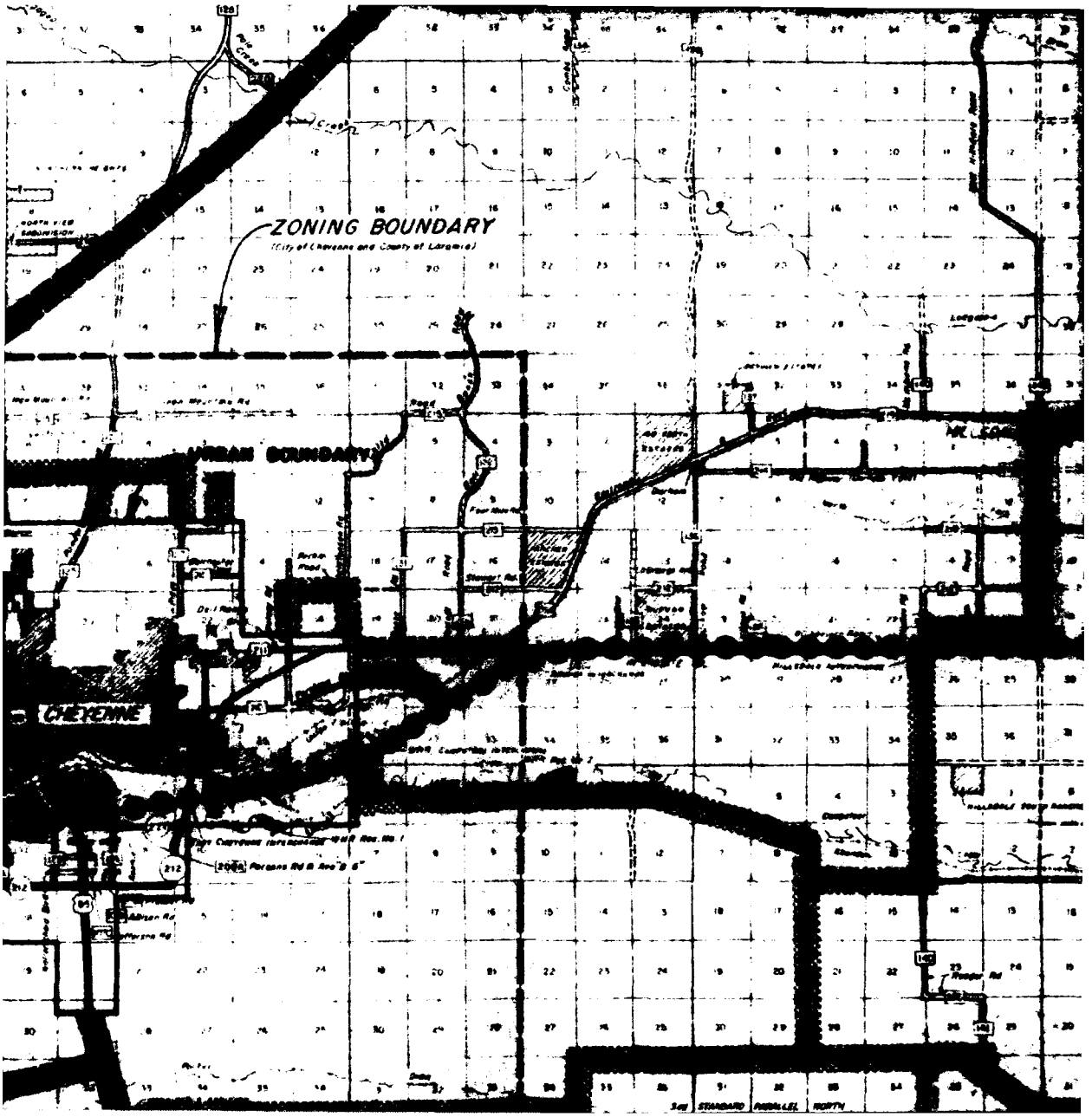
LEGEND

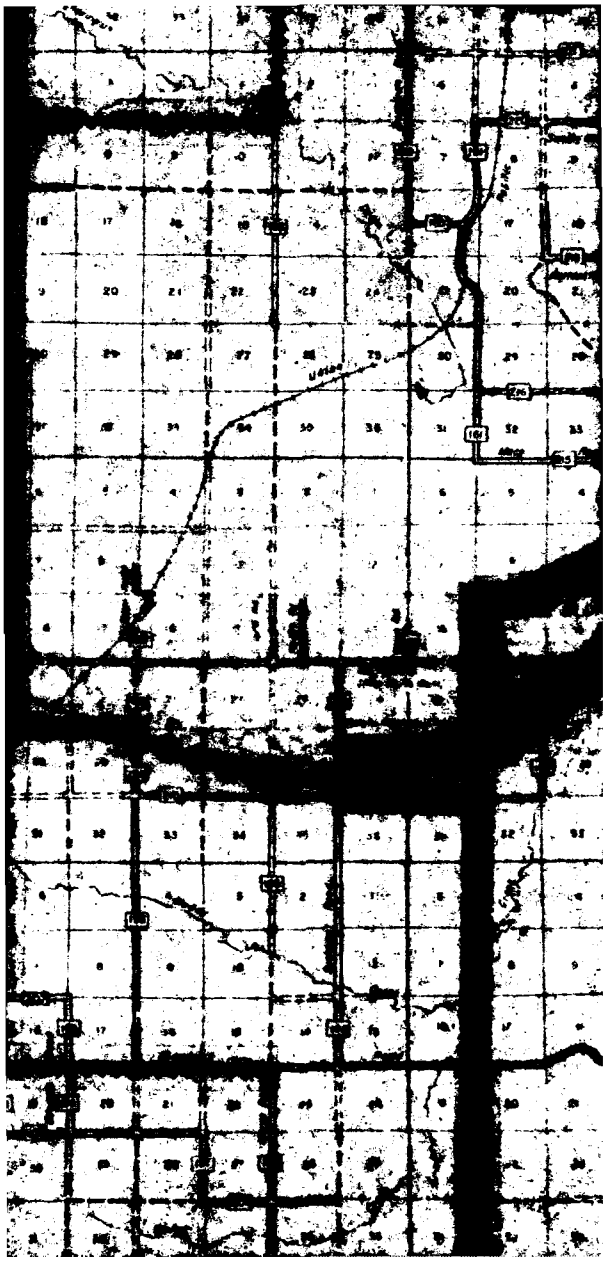
- Interstate Highway
- State Highway
- County Maintained Road
- Declared County Roads:
  - Paved Road
  - Graded & Drained Road
  - Graded Road, Low Type
  - Primitive Road
  - Undeveloped Road
- T/E Route
- Minor Collector (County)
- Major Collector (State)
- Minor Arterial (State)
- Interstate

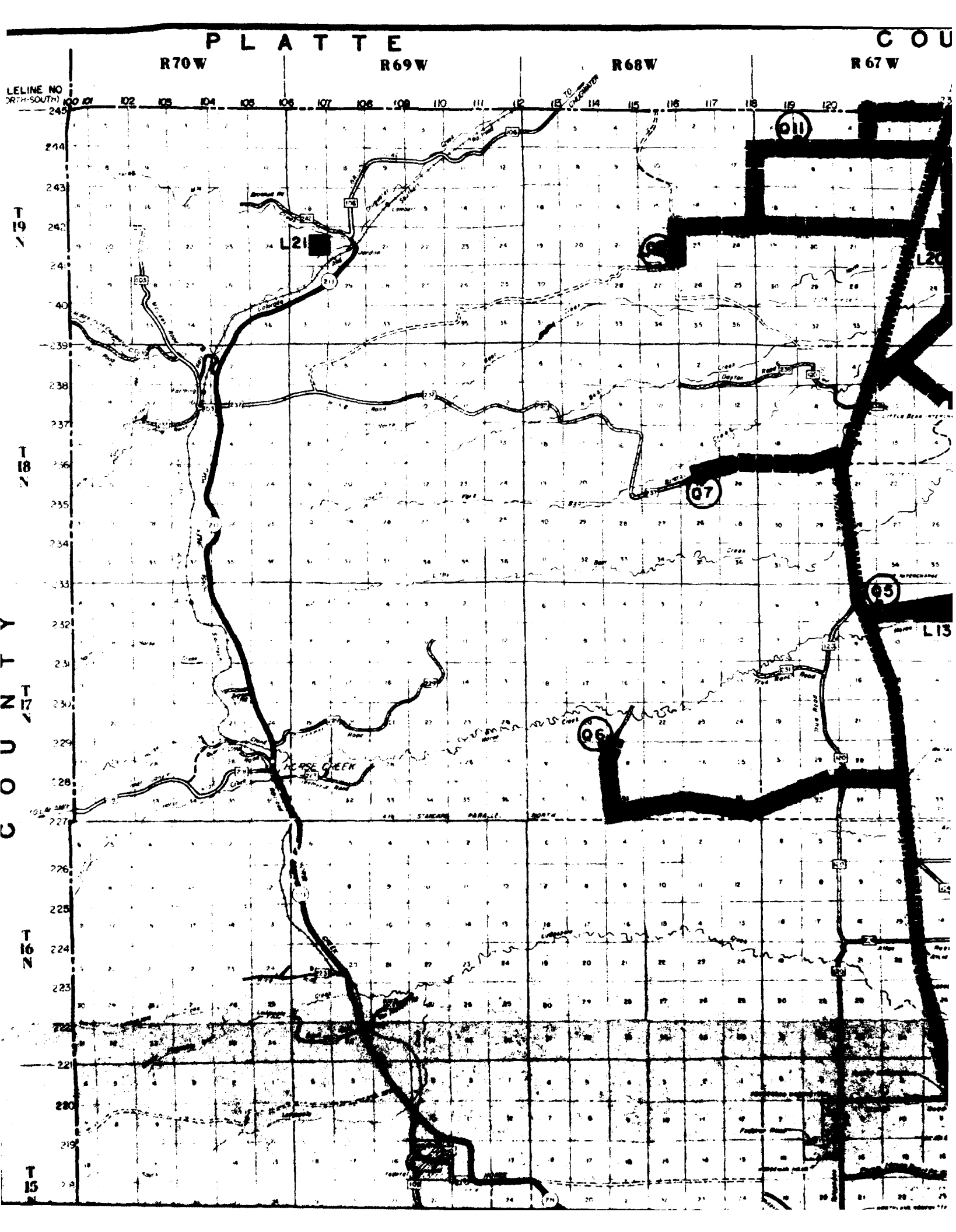
N

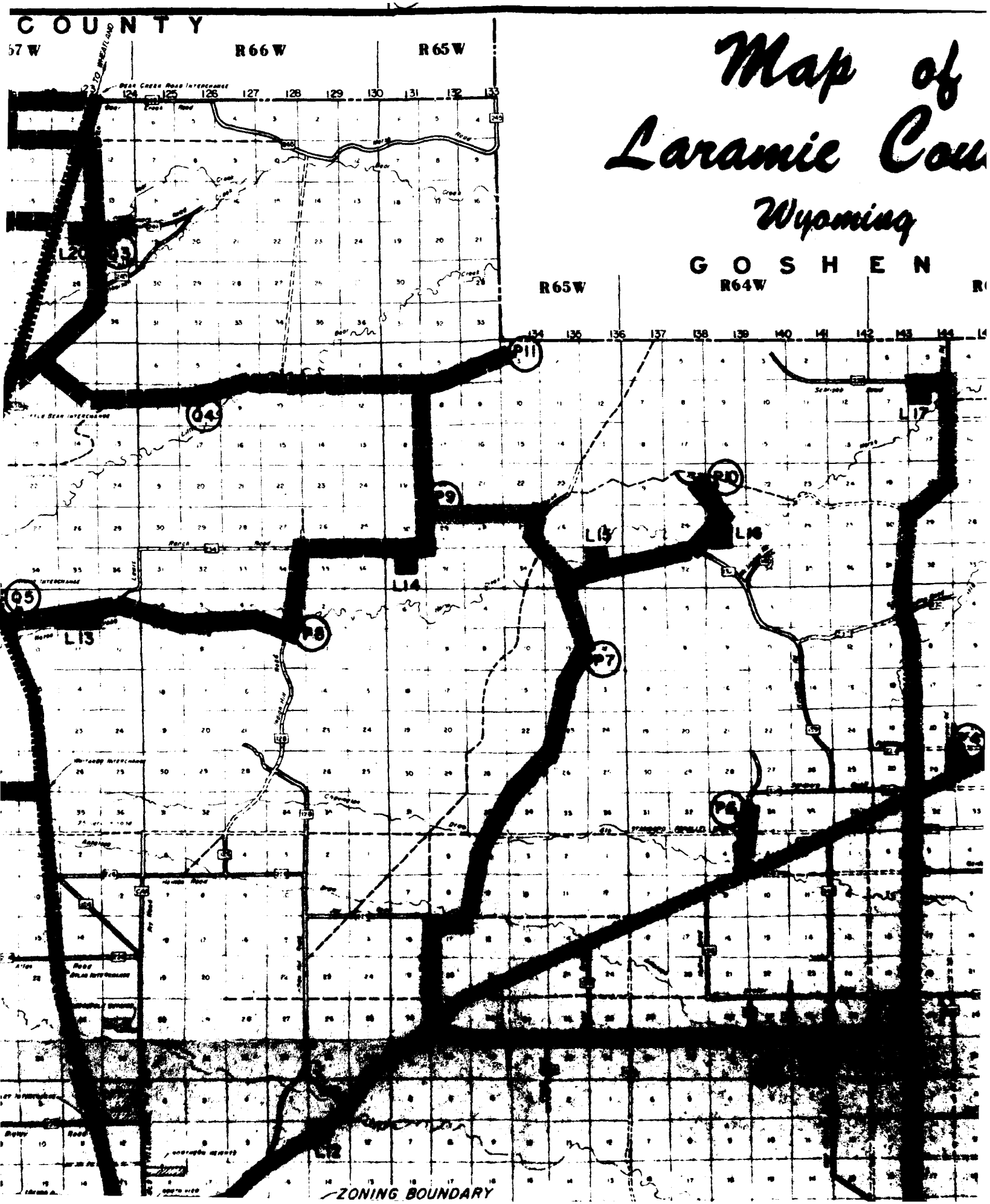
SCALE
Miles
0 1 2


ALBANY
T 16 N
T 15 N
T 14 N
T 13 N
T 12 N
R70W
R69W
R68W
R67W
LARIMER COUNTY
STANDARD PARALLEL NORTH
MILELINE NO. (EAST-WEST)


ZONING BOUNDARY
(City of Cheyenne and County of Laramie)
URBAN BOUNDARY
CHEYENNE




PLATTE
COU
R70W
R69W
R68W
R67W
T 19 N
T 18 N
T 17 N
T 16 N
T 15 N
COUNTY
L21
L20
L13
Q11
Q7
Q5
Q6
HORSE CREEK


COUNTY
57W
R66W
R65W
Map of
Laramie Cou
Wyoming
GOSHEN
R65W
R64W
ZONING BOUNDARY

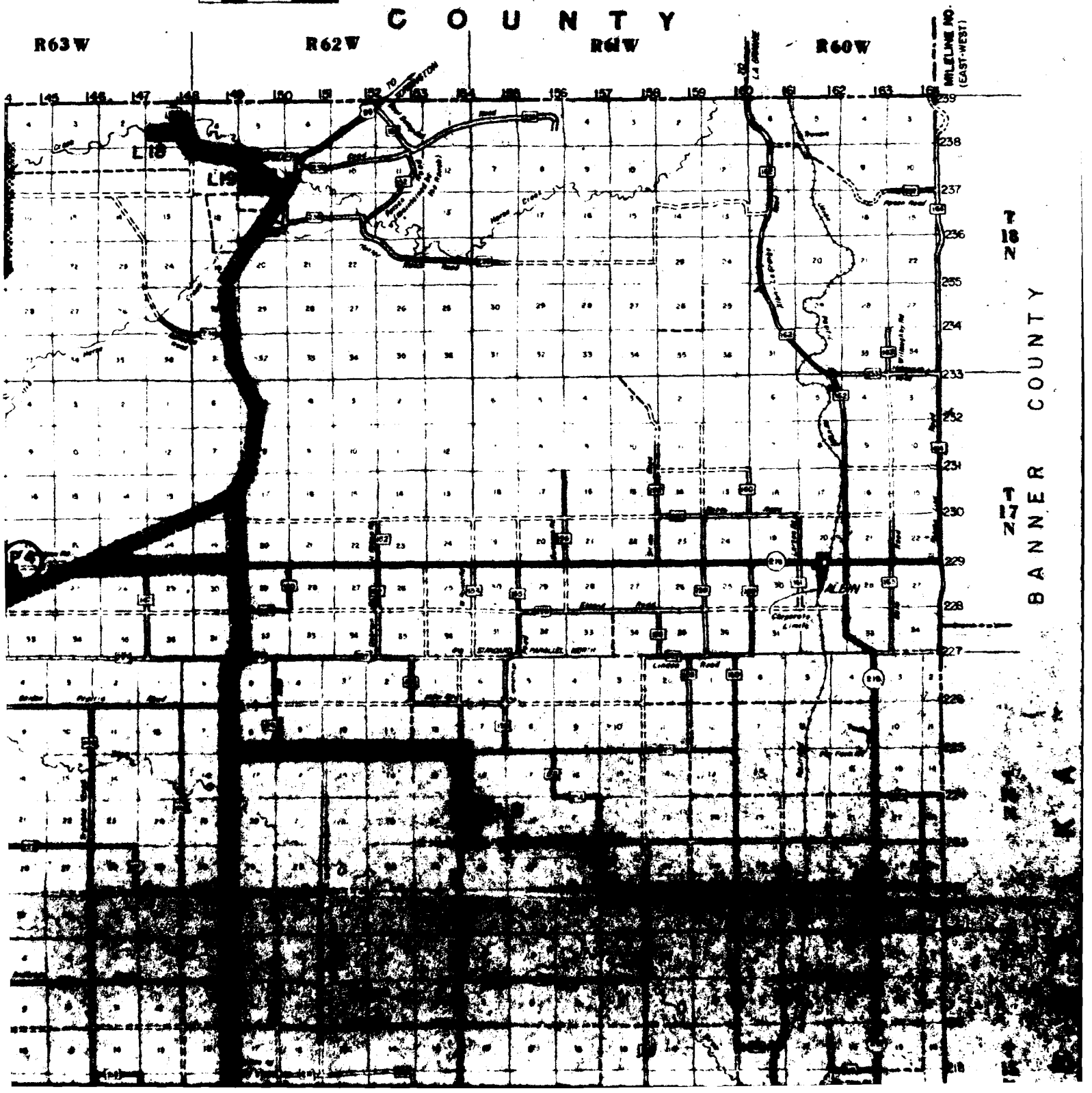
COUNTY ROAD MAP OF LARAMIE COUNTY, WYOMING

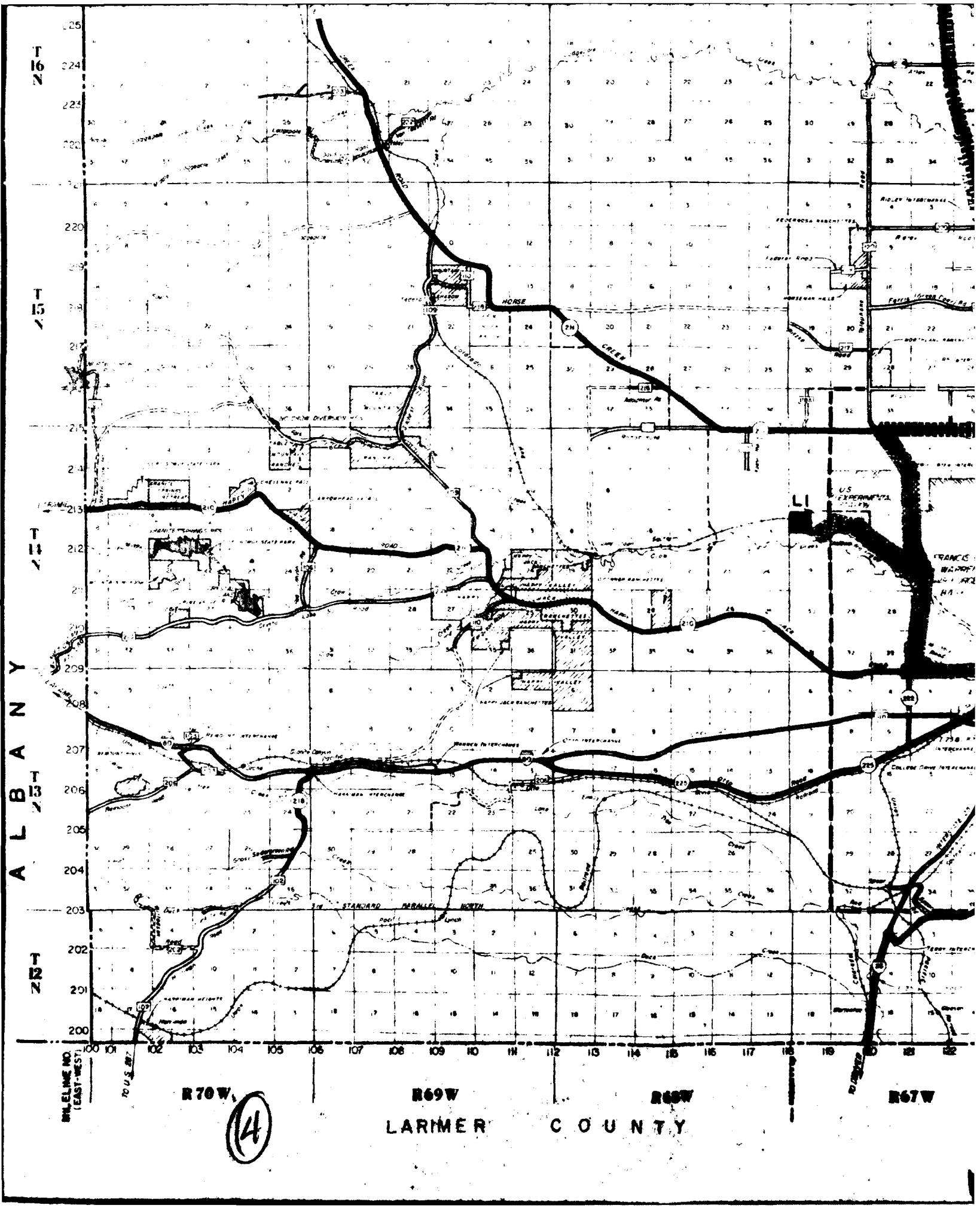
LEGEND

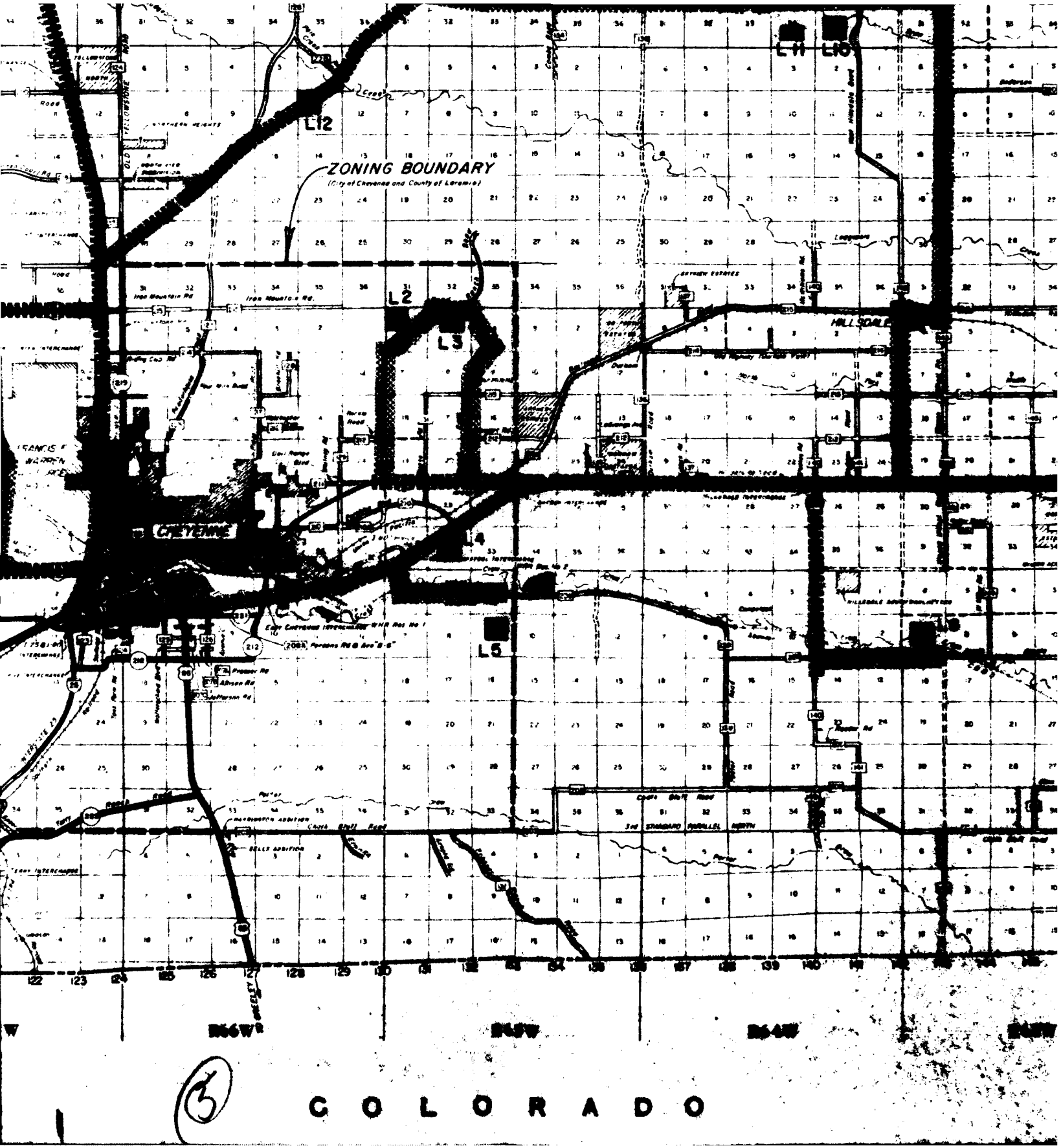
From State/Fed Hwy to [illegible] (T/F Route) via County Road
State/Fed Hwy Access
Gravel Pit Access to State/Fed Hwy (Primary)
Gravel Pit Access to State/Fed Hwy (Secondary)
Missile Silo
Gravel Pit

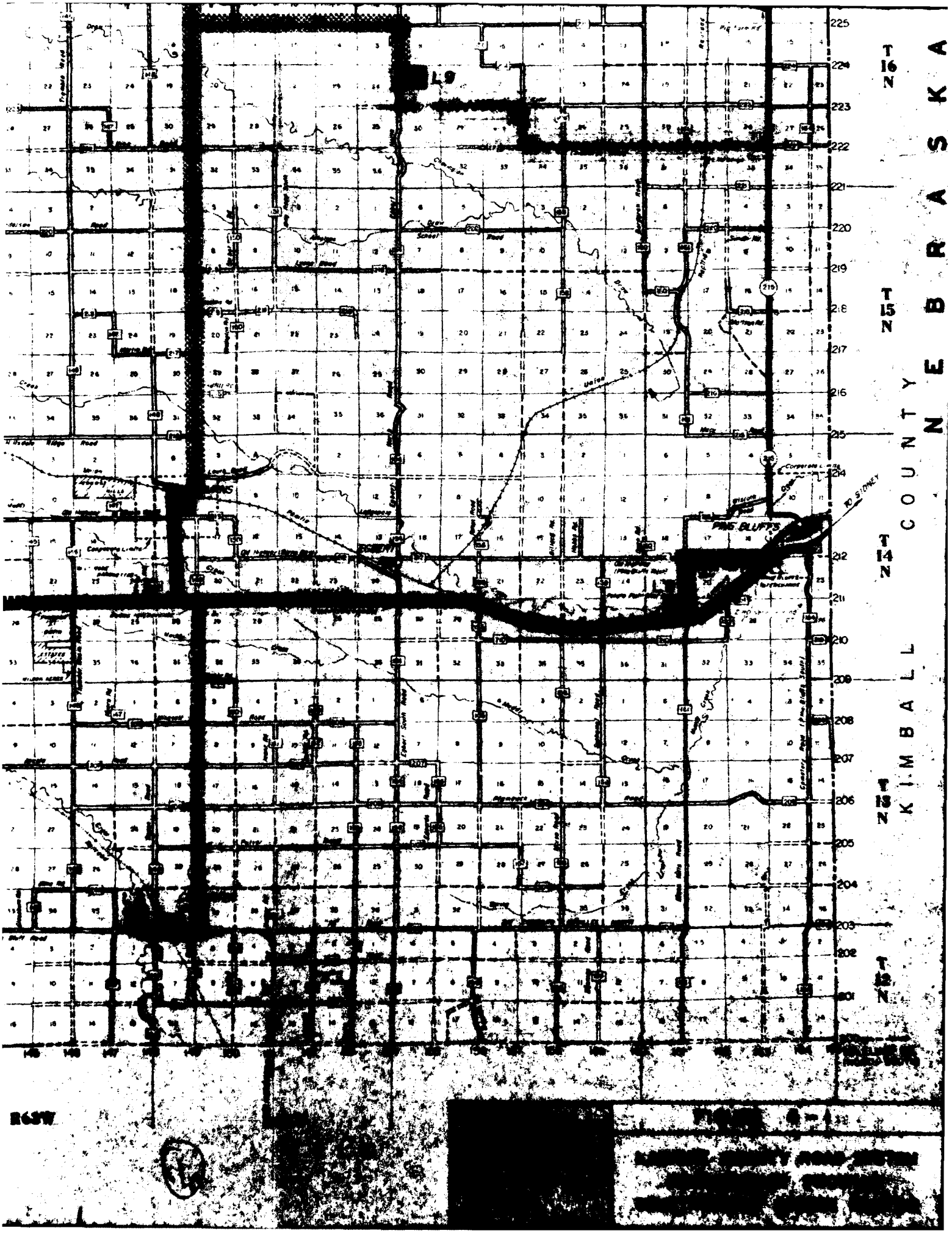
N

SCALE
Miles
0 1 2




T 16 N
T 15 N
T 14 N
T 13 N
T 12 N
ALBANY
HORSE
CREEK
ROAD
R70W
R69W
R68W
R67W
LARIMER COUNTY
14


ZONING BOUNDARY
(City of Cheyenne and County of Laramie)
L12
L11
L10
L2
L3
L4
L5
CHEYENNE
HILLSDALE
R66W
R65W
R64W
COLORADO


KIMBALL COUNTY NEBRASKA
T 16 N
T 15 N
T 14 N
T 13 N
T 12 N
R63W
PINE BLUFFS
TO SIDNEY